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ASTRONOMICAL

OBSERVATIONS

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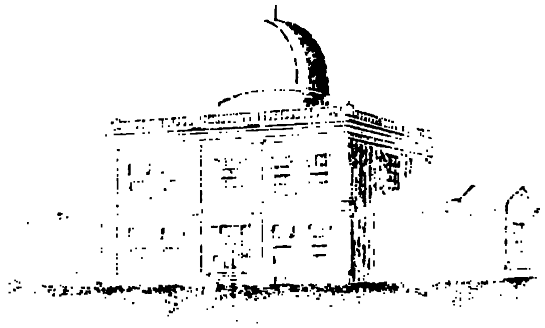
[illegible]

AT THE

NATIONAL OBSERVATORY,

WASHINGTON.



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DURING THE YEAR 1846,

AT THE

NATIONAL OBSERVATORY,

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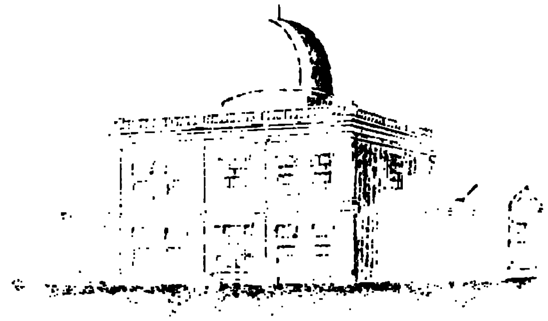

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ASTRONOMICAL OBSERVATIONS

MADE

DURING THE YEAR 1846

AT THE

NATIONAL OBSERVATORY,

WASHINGTON:

UNDER THE DIRECTION OF

M. F. MAURY, Lieut. UNITED STATES NAVY,

SUPERINTENDENT:

COMMODORE L. WARRINGTON,

CHIEF OF BUREAU OF ORDNANCE AND HYDROGRAPHY.

VOL. II.

PUBLISHED BY AUTHORITY OF THE HON. WM. A. GRAHAM,
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1851.

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INTRODUCTION

TO THE

PRINTED OBSERVATIONS

FOR 1846.

The Observatory is situated in Washington, on the left bank of the Potomac, 94 feet above the level of the sea.

The view on the meridian towards the South crosses the river twice before reaching an elevation suitable for a meridian mark in that direction.

At the distance of about a mile to the North, the meridian line crosses Rock Creek, continuing thence a short distance it passes the heights of Georgetown, which are, for the most part, covered with forest trees.

Rock Creek is in a deep gorge, and the meridian of the Observatory crosses both it and the Potomac at oblique angles. The atmosphere in the line of vision to meridian marks—which line passes very near the water—is, it may be correctly supposed, liable to irregularities in its powers of lateral refraction, for that over the land must sometimes be of a temperature quite different from that over the water of the Potomac and the gorges of Rock Creek.

Consequently, if there be a difference of temperature in the air through which a pencil of rays from the other side of these streams would have to pass in its course to the instruments, this pencil would be turned aside by lateral refraction, sometimes in one direction and sometimes in another, and a Meridian mark beyond would be both unsteady and uncertain.

Owing to these circumstances, viz: the Potomac on the South, Rock Creek and the tree-covered heights of Georgetown beyond, on the North, a suitable place for distant meridian marks for the instruments cannot be obtained.

Under these circumstances, and with the advantages and powers of the collimating eye-piece for the error of level and collimation, I have judged it better to depend, for the present, upon actual observations for the errors of azimuth than to trust to such distant meridian marks as might be erected, the erection of which, if practicable, would be attended with considerable expense.

The grounds of the Observatory cover 17 acres; they are enclosed on three sides by a brick wall, and on the fourth by a picket fence.

The grounds are in a rough unfinished state; they require heavy excavation and embankments. A meridian mark at the distance of about 300 feet within the grounds may be erected after the hands employed in grading shall have finished their work; so far, therefore, it has not been practicable to avail ourselves of any meridian mark whatever.

The Observatory is a brick building 50 × 40 feet, surmounted by a dome put in the clear, and having wings to the South, the East and the West. In these wings and dome, the instruments are situated, leaving the main building for official purposes. It has four rooms on each floor which are occupied—one as a library, one as a chart room, two as drafting rooms for the construction of charts, two as computing rooms, one as an office room for the Lieutenants, and the other as an office room for the Passed Midshipmen, in which the various duties required of them are performed.

Of the four basement rooms, one of them is occupied as a shop by Mr. Brown, the Machinist of the Observatory, another by the Watchman, and the two others as coal rooms and air chambers for warming the building in winter.

The East wing is 48 × 18. It is divided into two rooms, in one of which are the Mural and Meridian circles, in the other the Chronometers. It connects with the dwelling of the Superintendent, under which is the furnace for warming the Observatory.

The warming is done by conducting hot water, in large iron pipes laid under ground from the basement of the dwelling to the basement of the Observatory. The plan is beautiful, the arrangement economical and the heat very pleasant.

The Observatory is a part of the establishment of the Bureau of Ordnance and Hydrography. Of which Bureau Commodore Lewis Warrington is the chief. It is therefore a Naval Institution, and by law the Superintendent of the Observatory is required to be an officer of the Navy not below the grade of Lieutenant.

His assistants, with barely an exception, are also officers of the Navy, selected from the grades of Lieutenant, Passed Midshipman and Professor of Mathematics.

Besides the duties of the Observatory, the Superintendent is charged, under the Bureau of Ordnance and Hydrography, with the Hydrographical Department of the Government, with the purchase, examination, safe-keeping and distribution of all the Nautical Instruments, books, maps and charts required for the purposes and use of the Navy.

The personnel of the establishment is distributed in the following manner, when the exigencies of the public service are such as to allow a full complement of officers, viz: A Lieutenant and Professor of Mathematics are assigned as observers to each of the Meridian Instruments. These officers take turns as observers. As the observers are not lodged near the Observatory, but live in various parts of the city, it has always been left optional with them to relieve each other at intervals of 12 or 24 hours, according to their own convenience. They have usually preferred the latter.

In clear weather, the term of duty for one observer continues from sunrise to sunrise. The observer last off goes home at sunrise, sleeps till 10 or 12 o'clock, according to the season of the year; returns to the Observatory and remains till 3 P. M., engaged in the reduction of his observations.

When the weather is unsuitable for observing, the officers come to the Observatory at 9 A. M., and remain until 3 P. M., being required to work only 6 hours.

It becomes frequently necessary to impose upon them a greater amount of labor than this, and in every instance and on all occasions the calls for extra work have been cheerfully responded to by the observers as well as by all in every other part of the establishment.

Not more than one observer has been employed at a time with the Equatorial and the Prime Vertical Transit Instrument.

The observers of these instruments are required to observe every clear night, Sundays excepted. But they are not required to observe later than 2 A. M., though they often choose to remain at work until daylight.

The permanent adjustments of the instruments are not disturbed unless by the Superintendent, or with his especial leave. This arrangement is the more necessary as the number of observers is increased.

Each observer is held responsible for his own work, notwithstanding computers may be assigned to assist in the reduction of his observations. It is made his duty to look to the work of such computers and to see that it is right.

So also, when there are more observers than one at the instrument, or whenever an officer in charge of an instrument is suddenly ordered off to sea, before his observations are ready for the press, it has been found expedient in such cases to give some one of the professors of mathematics, who are not liable to be so ordered away, the general charge of the observations, with some one or other of the instruments.

The officer especially charged with the work of any instrument, is expected to take care of the observing books containing the work which has been done at that instrument; when assistants, as the Passed Midshipmen often are, are detailed for the reduction of the observations, the professor charged with the work also instructs them as to the formulæ, and the order in which the observations are to be arranged for the press, according to the directions of the Superintendent.

The officer charged with the observations also reads the proof, and in the case of this volume, owing to the bad health and the pressing nature of the official calls upon the time of the Superintendent, they have also been required to write out the explanations to the printed observations each for his own instrument, viz: Professor Keith for the West Transit; Professor Coffin for the Mural Circle, and Professor Hubbard for the Meridian Circle and Prime Vertical Transit Instrument.

The business correspondence of the office is large, and as there is no regular clerk allowed, much of the Superintendent's time is daily taken up with this.

There are in addition to this upwards of 1000 ships daily engaged in making, in concert with him, and in all parts of the Ocean, observations upon the winds and currents of the sea, upon the barometer, the air and water thermometer, and other phenomena calculated to facilitate or improve navigation, or to advance our knowledge concerning the laws or the facts connected with the general system of the aqueous and atmospherical circulation of the globe.

These observations are discussed in the most elaborate manner, and entirely regardless of all theory, with the view of comparing each one with all the rest, and of eliciting from them all the facts which they contain with regard to the general circulation of the sea and the air, with regard to thunder, lightning, rains, fogs, storms and calms, to currents, climates, temperatures of air and water, and to the discovery both of dangers and facilities to navigation, and to the migration and habits of the whale.

A large corps, principally consisting of Lieutenants and Passed Midshipmen, is engaged upon the details of these investigations. They are liable to be called away to sea, and often are at a moment's warning, and that so frequently, that almost the entire corps is sometimes ordered off to sea, and a new one sent in its place, so as to form, in the course of a few weeks, a complete change of the officers engaged upon these investigations. Owing to this liability, and to the fact that there is no permanent assistant in the Hydrographical Department, the Superintendent is compelled to charge himself with a close and personal examination of many of the details connected with these investigations.

He is charged also with the trial of chronometers, and, as before remarked, with the selection and purchase of all the nautical books, maps, charts, and instruments for the Navy of the United States, and the supplying of every ship with her allowance of them.

THE WEST TRANSIT INSTRUMENT.

This instrument has been minutely described in the volume of observations for 1845.

The telescope has a focal length of 7 ft. 1 in. and a clear aperture of 5.3 in. It is mounted upon firm piers of granite, resting on a foundation of stone, sunk ten feet below the surface of the ground.

In the month of February, the diaphragm was turned round 90°, in order that the micrometer used in azimuth might be used in altitude for sweeping, and a new system of vertical wires put in. In other respects the instrument has remained unchanged.

The observations have been made by Lt. J. J. Almy and Prof. R. Keith.

For the determination of their personal equation, Lt. Almy and Prof. Keith, observed the same star at the same culmination on alternate wires. The mean of twenty observations gives the time by Prof. Keith, 0s.36 later than that by Lt. Almy: or

$$K = A + 0s.36$$

In obtaining the clock rates, and in correcting the observations of one observer for the clock error determined by the other, this quantity has been used.

Observations have been made of the Sun, Moon and of the Moon-culminating stars, planets and asteroids, of the fundamental stars, and of the stars observed with comets or planets by the observers at the Equatorial. These occupy pages 1–42.

When not engaged with these observations the instrument has been steadily used in making observations for the Washington Catalogue.

The first column of the printed observations, pp. 1–42, contains the date, the day beginning with the transit of the Sun.

The second contains the name of the object observed. The name of the constellation followed by the number of the Catalogue of the British Association, has been given for those stars which are not designated by a Greek letter, and are not found in the Nautical Almanac. For stars not found in the Catalogue of the British Association, the number of Bessel's Zones has been given, with the declination. A few not found in any catalogue, are designated by the declination alone.

The third to the ninth column inclusive, contains the seconds for the time of transit over each wire, as noted by the observer.

The tenth contains the mean of the preceding times of transit over the wires observed.

The eleventh to the thirteenth inclusive, contains the reduction to the meridian, the reduction of the first second limb of an object to its centre, and the correction of the clock.

The reductions of the observations to the meridian, have been computed by the formula

$$S = C \sec.\delta + c \sec.\delta + n \tan.\delta + m.$$

In which δ is the declination of the object observed, C the equatorial reduction of the mean of the wires ob served to the mean of the seven, c the equatorial reduction of the mean of the seven, to the plane in which th instrument revolves, and $n \tan.\delta + m$ the reduction of the plane in which the instrument revolves to the plane the meridian.

The equatorial reductions of each wire to the mean of the seven, as determined by the mean of 20 obse vations of Polaris, are:

From Jan. 1 to Feb. 3.	From Feb. 3 to Dec. 31.
s.	s.
A +43.471	A +37.686
B +29.026	B +25.030
C +14.506	C +12.389
D + 0.059	D — 0.138
E —14.600	E —12.515
F —28.978	F —24.922
G —43.483	G —37.532

For stars within 5° of the pole, C sec. δ has been corrected by means of the following table. Arc—si being taken out for each wire observed, and the sum, divided by the number of wires, added to C sec. δ.

H. Angle.	(Arc—Sin.)	H. Angle.	(Arc—Sin.)	H. Angle.	(Arc—Sin.)
	s.		s.		s.
3	0.00	12	0.33	21	1.76
4	.01	13	.42	22	2.03
5	.02	14	.52	23	2.32
6	.04	15	.64	24	2.63
7	.07	16	.78	25	2.97
8	.10	17	0.94	26	3.34
9	.14	18	1.12	27	3.74
10	.19	19	1.31	28	4.17
11	0.25	20	1.52	29	4.64

The collimation c has been determined by the formulæ:

$$c = \tfrac{1}{2}(\triangle - \triangle^1) - p + r + a \qquad \text{for clamp East.}$$

$$c = -\tfrac{1}{2}(\triangle - \triangle^1) + p + r + a \qquad \text{for clamp West.}$$

In which $2\triangle =$ the distance of the middle wire West of its image over the mercury, when the clamp is Eas

$2\triangle^1 =$ the same, when the clamp is West.

$p =$ one half the excess of the clamp pivot.

$r =$ the reduction of the mean of the seven wires to the middle wire.

$a = -0^s.016$, the correction for diurnal aberration in the Lat. ϕ. The quantities $2\triangle$ and $2\triangle^1$ were obtained by direct measurement with the micrometer, until the eye piece was changed for catalogueing. After this, the micrometer wire was made to approach the fixed horizontal wire, until the distance between them was made by estimation equal to $2\triangle$ or $2\triangle^1$. When the quantities are small, the measure of this distance is quite as satisfactory as the direct measure of the quantity itself; since it is as easy to decide upon the equality of the distances between two pairs of close parallel lines which cross each other and should form a square, as upon the coincidence of a wire with its image.

If b represent the depression of the eastern end of the axis:

$$b = -\tfrac{1}{4}(\triangle + \triangle^1) - p \quad \text{for clamp East.}$$
$$b = -\tfrac{1}{4}(\triangle + \triangle^1) + p \quad \text{for clamp West.}$$

$b \pm p$ was also frequently measured with the striding level, generally once or twice on each day of observation.

The quantities n and m, being the angles which the line of no collimation makes with the plane of the meridian, the first at the pole, the second at the equator, were determined by means of the formulæ:

$$n = (\alpha-\tau)-(\alpha'-\tau')\ \text{cos.}\ \delta\ \text{cos.}\ \delta\ \text{cosec.}\ (\delta-\delta')-c\ \text{sin.}\ \tfrac{1}{2}(\delta+\delta')\ \text{sec.}\ \tfrac{1}{2}(\delta-\delta')$$
$$m = -n\ \text{tang.}\ \phi + b\ \text{sec.}\ \phi.$$

In which α τ and δ are respectively, the Right Ascension, time of transit, and Declination, of a circumpolar star; α' τ' and δ' of an equatorial star.

In computing n, $(\alpha-\tau)-(\alpha'-\tau')$ was deduced from every observation of Polaris, and a mean of these quantities taken for the whole period, during which their discrepancies were not greater than the probable error of a single observation of Polaris.

The semi-diameters were interpolated from those given in the Nautical Almanac.

The correction of the clock has been determined from three or more of the Nautical Almanac stars, within 30° of the Equator; and a mean of the determinations adopted for the mean of the times of observation.

The rate of the clock being very irregular, a series of equations of condition involving the rate of the clock, and the changes of the barometer and thermometer were solved, in order to test the compensation of the pendulum. But no satisfactory result could be obtained. The changes in the rate being evidently due to instability in the mountings of the clock, or to some imperfection in the wheel work.

The fifteenth column, contains the reduced right ascensions.

The sixteenth, contains the reduction of stars to their mean places for the beginning of 1850.

The co-efficients used in these reductions are those given in the introduction to the Catalogue of the British Association. Most of the reductions have been computed with the *a*, *b*, *c*, *d*, of the catalogue and the A, B, C, D, of the Nautical Almanac, corrected by adding 0.0013 to the logarithms of A and B. The reductions of Polaris, δ Ursæ Minoris, and λ Ursæ Minoris, have been computed by means of the formulæ:

$$\triangle a = l \cos.(L - \odot) + l' \cos.(L' - 2\odot) + m \cos.(M - \text{☊}) + m' \cos.(L' - 2\,\text{☊}) + m'' \cos.(L - 2\,\text{☾})$$

$+ f + t\,(c + \triangle c.)$ In which,

$\tan. L = \sec.\ \omega\ \tan.\ a$ $\quad l = 1s.250\ \cos.\ a\ \sec.\ L\ \sec.\ \delta$ $\quad m' = -\tfrac{1}{4}\,l'$

$\tan. L' = \sec.\ \omega\ \tan.\ a$ $\quad l' = 0s.0363\ \cos.\ a\ \sec.\ L'\ \tan.\ \delta$ $\quad m'' = \tfrac{1}{4}\,l'$

$\tan. M = 0.7446\ \tan.\ a$ $\quad m = 0s.6167\ \cos.\ a\ \sec.\ M\ \tan.\ \delta$

On pages 362 to 369 inclusive, have been collected together the mean places of each star observed.

This was done after the observations themselves had been printed, some errors in the application of the reductions were corrected; and it is believed that the only errors which remain now are those of observation. Those which have been rejected in taking the mean are enclosed in brackets.

On pages 404 to 406 inclusive, are given the comparison of the observations of the Sun, Moon and Planets, with their tabular places interpolated with 2d and 3d differences from the Nautical Almanac. The observations of Neptune have been compared with the ephemeris published by the Smithsonian Institute.

The computation of the reductions generally has been made by Prof. Beecher or Prof. Keith. The application of them to the observations by some of the Passed Midshipmen attached at different times to the Institution.

THE MURAL CIRCLE.

The Mural Circle was constructed by Troughton & Simms, of London.

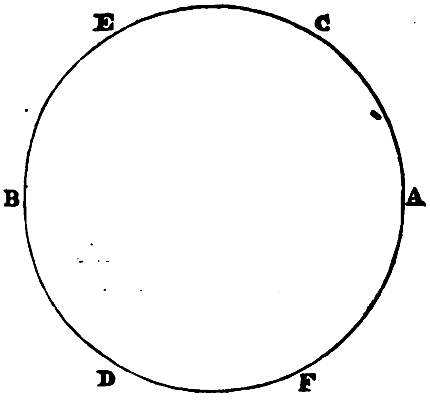
During this year, it has remained in the *East* observing room, and upon the eastern face of the sand-stone pier, to which it was removed in the latter part of 1845. This pier is nine feet four inches high, six feet from N. to S., and three feet three inches from E. to W.

The axis of the instrument reaches entirely across the pier, through an arch-way of thirty-two inches span and twenty-one inches pitch.

The circle is placed upon the eastern end of the axis, which is sustained in part on friction rollers supported by counterpoises. It is *five* feet in diameter. The divisions are upon the periphery of the rim, cut upon a band of gold, and 5′ apart. They are read off by means of six of "Troughton's Reading Microscopes," mounted firmly upon the face of the pier and adjusted, as nearly as practicable, 60° from each other. These microscopes are designated in the observations by the letters A, B, C, D, E, F. They are arranged as in the accompanying diagram: A being on the North side of the pier, and the line through the center joining A and B, being horizontal. By this arrangement

(the reading for) B = (the reading for) A + 180°
" C " A + 300
" D " A + 120
" E " A + 240
" F " A + 60

approximatively.



These microscopes are adjusted, as to focal length, so that five revolutions of the micrometer-screw of each may measure one space, or 5′ of the circle. The micrometer heads are divided into sixty parts, reading therefore directly to *seconds*, or, by subdivisions easily made, to *tenths* of seconds. In general, in making readings of the Circle the *seconds* and *parts* are read from each of the six microscopes, and to these are prefixed the *degrees* and *minutes* from A alone. The mean of these six readings constitutes the "Circle Reading."

For illuminating the graduated limb, a lamp is placed behind the pier in a line with the axis of the instrument; the light from this lamp passes through six holes, bored through the pier, directly to the reflectors attached to the several microscopes. In this way a less variable illumination is secured than formerly by means of lamps carried in the hands. This method has in general been employed for the observations of this year, except in some of the day observations in the early part of the year, for which the divisions have been illuminated from the window in front of the Circle. The object aimed at has been, to have the same illumination for the readings of the Circle, both in the observation of a star and in the determination of the "Nadir Point," which is to be employed in its reduction.

The Circle is adjusted to a vertical position by means of a plummet suspended on a fine silver wire, with the aid of appendages attached to the telescope known as "Ramsden's Ghosts;" and to its position in the meridian by observations of the transits of circumpolar stars.

The telescope of this instrument has an object-glass of 4 inches clear aperture, with a focal length of 5 feet. It is attached to an independent axis, moving within the axis of the Circle, and may be moved to any position with reference to the graduations. The ends of the tube, or the cells supporting the object-glass and the micrometer, are firmly clamped to the rim of the Circle. During the greater part of this year, the position of the telescope has been such, that, when directed to the zenith, the "Circle Reading" has been nearly 0° 0′ 0″.

The eye-end of the telescope is furnished with a fixed diaphragm, containing seven vertical wires, designated *I. II. III.* &c., nearly equidistant and at an average interval apart of $15^s.4$ (of time), and one horizontal wire, which it is found convenient to call the *fixed wire*. The adjustments of this diaphragm have consisted in placing it in the principal focus of the object glass,—turning it so that an equatorial star will exactly traverse the *fixed wire*—and, the Circle being adjusted to an exact vertical position and the telescope directed to the nadir, moving the diaphragm so that *vertical wire IV* will coincide with its image reflected from a surface of quicksilver and seen by means of the collimating eye-piece.

In connection with the fixed diaphragm is another, moveable with a micrometer screw, and furnished at the commencement of the year, with one wire or spider's line only. In the latter part of February, in order to adapt the instrument to the work of cataloguing, this diaphragm was furnished with *eight* additional wires parallel to the original one, and distributed on each side of it at distances equivalent to five revolutions of the micrometer screw. Subsequently the four nearest to the middle or original one were removed; those, which remained being respectively *five*, *fifteen*, *fifteen*, *five* revolutions apart. In the record of the work in which they have been employed, they are numbered 1, 2, 3, 4, 5, in the order of the micrometer scale, i. e. commencing in the Southern part of the field of view. To render available so large an extent of field in declination, as is embraced in this system of wires, the eye-piece was also provided with a vertical motion. The adjustment of this diaphragm consists in making *wire* 3 parallel to the *fixed wire*.

The *head* of the telescope micrometer is divided into 100 parts, and is usually read to *thousandths* of a revolution. It is adjusted so that when *wire* 3 is moved into coincidence with the *fixed wire*, the micrometer reading shall be nearly $30^r.000$: $30^r.$ indicating the notch of the micrometer scale, which is intersected by the *fixed wire*. In making a micrometer reading, that notch of the scale is noted which the wire, used in the observation, has passed.

OBSERVATIONS.

The observations with this instrument have been made by the same observers as in 1845, viz: Lieut. T. J. Page and Prof. J. H. C. Coffin, of the U. S. Navy. In the "printed observations," the initials "P." and "C." indicate the work of each.

The determinations of the value of the telescope micrometer and of the minor corrections of the instrument, and most of the adjustments, have been attended to by Prof. Coffin.

The series of observations for determining the declination of the Sun, Moon, Planets and fundamental Stars, commenced in the previous year, have been continued in this. The declinations of several comet and other stars, whose places were desired, have also been determined.

The principal work with this instrument, as well as of the other meridian instruments, after the first of April, when the arrangements for it were completed, has been that of cataloguing or sweeping the heavens in belts or "zones." The description of the method and character of this work, is reserved until the publication of the observations.

The method of making the ordinary observations has been the same as in the preceding year, except that a freer use has been made of the micrometer. Thus, many of the observations on Polaris have been made with the micrometer, and a larger number of observations on the Sun and Moon at the same culmination. In this way, three classes of observations have been introduced.

In the first and largest class, the Circle is moved by means of a clamp and tangent-screw until the *fixed wire* exactly bisects the star, or is in contact with the limb of the Sun, Moon or Planet.

In the second, one or more bisections or contacts are made with one of the *micrometer wires*, the Circle remaining fixed in position.

The third class, as in some of the observations on Polaris and the Moon, combines both the preceding; an observation being first made with the *fixed wire*, and, the Circle remaining fixed, bisections or contacts repeated with the *micrometer*. In observing both limbs of a planet, it has been customary to bring the fixed wire into contact with one limb, and the micrometer wire into contact with the other.

In all observations care has been taken,—to note either the time of each bisection or contact, or the position of the star with regard to some one of the *vertical wires*—to note the indications of the Barometer and the External Thermometer (particularly the latter;) and to read the Circle whenever practicable, immediately before or after observing the object. In almost all the observations, a power of 125 has been employed. The instrument is furnished with screens to protect it, when employed in observations of the sun, from the heat of the solar rays.

NADIR POINT.

The determinations of the "Nadir Point" have also been made in the same way as in 1845, by means of the "collimating eye-piece." The telescope being directed downwards, the Circle is moved by one of the tangent-screws, until the *fixed wire*, illuminated by means of this eye-piece, coincides with its image reflected from a surface of mercury; then the "Circle Reading," corrected for runs, &c., constitutes the " Nadir

Point." Each determination consists of several such coincidences and "Circle Readings," the wire and it image being brought to coincidence alternately from opposite sides.

These "Nadir Points" exhibit at times considerable fluctuations, attributable perhaps mainly to difference of exposure and temperature of the northern and southern sides of the pier, and to changes in the position o the *fixed wire* occasioned by the action of the solar rays upon the diaphragm in observations of the Sun, an by currents of air in the frequent change of eye-pieces. The effect of changes of temperature seems to b masked in changes of greater magnitude. A marked effect however is deserving of notice, viz: variations some times exceeding 3″, whenever the temperature of the pier is in the vicinity of 32°. Examples of this will b found on January 23, and March 3d of this year, and on several days in December, 1845.

EXAMINATION OF THE GRADUATIONS OF THE CIRCLE.

The constant use of the same graduations of the Circle in the readings for the "Nadir Point," has rendere desirable a careful examination of these graduations for the determination of the accidental errors of division The errors of form, it is presumed, are nearly eliminated by the use of six equidistant microscopes. *(Vid Washington Observations*, 1845, *appendix*, *page* 116.*)*

For this purpose six sets of observations have been made, each consisting in the careful and repeate measurement by means of the microscope micrometers, of six, or more, successive spaces in the vicinity of o embracing these particular graduations. From these measured runs have been obtained the minimum correc tions, which will render the spaces equal; and thence, the corrections for the graduations themselves have bee derived, their sum being made 0.

The following table contains these corrections as they are to be applied to the readings of the Circle. Th *degrees* are given at the side for the lines of division under microscope A. Those for the other microscopes ar readily obtained from the quantities at the heads of the several columns. The *minutes* belong alike to all.

TABLE A.

Corrections to be applied to the readings of the Circle.

Vicinity	of 180° A.	0° B.	120° C.	300° D.	60° E.	240° F.	Mean.	No. of sets of Meas'ts.
° ′	″	″	″	″	″	″	″	
179 25	—0.32	+0.25	+0.21	+0.18	+0.03	+0.55	+ 0.150	1
30	.57	+ .12	.23	— .29	— .13	+ .79	.027	1
35	.11	— .11	+ .34	+ .54	+ .17	— .09	+ .125	3
40	— .07	+ .13	— .03	+ .27	— .03	.70	— .072	3
45	+ .48	.08	.29	— .25	+ .13	.51	— .060	4
50	.47	+ .30	.29	.22	+ .01	.25	+ .003	4
55	+ .30	— .16	.15	.30	— .28	— .19	— .127	4
180 0	— .11	.76	— .38	.21	+ .08	+ .26	.187	4
5	.13	— .14	+ .08	.43	.00	+ .29	.054	4
10	.38	+ .02	+ .22	— .15	+ .02	— .10	.062	4
15	— .12	— .30	— .06	+ .12	— .13	.16	.109	4
20	+ .22	— .34	+ .29	— .12	— .08	.07	— .016	3
25	.00	+ .25	+ .26	— .04	+ .01	— .21	+ .047	3
30	+ .39	.21	— .05	+ .45	.10	+ .01	.185	1
35	—0.03	+0.47	—0.48	+0.41	+0.08	+0.39	+ 0.140	1

A similar series of corrections for graduations in the vicinity of 10°, 70°, &c. from observations made in 1848, is also placed here, as some use is made of them in the present volume.

TABLE A′.

Corrections to be applied to the reading of the Circle.

Vicinity	of 190°	10°	130°	310°	70°	250°		No. of sets. of Meas'ts.
	A.	B.	C.	D.	E.	F.	Mean.	
° ′	″	″	″	″	″	″	″	
189 30	−0.16	−0.11	+0.26	+0.29	−0.21	+0.32	+ 0.065	1
35	.07	+ .10	+ .30	− .02	− .04	− .02	.042	2
40	− .12	+ .17	− .29	+ .45	+ .47	+ .11	+ .132	2
45	+ .10	− .14	+ .04	− .20	− .03	+ .06	− .028	6
50	.14	− .35	− .23	.38	+ .12	− .15	− .142	6
55	+ .29	+ .05	− .06	.15	.29	.09	+ .055	6
190 0	− .09	.23	+ .06	.43	+ .03	− .08	− .017	6
5	+ .12	.25	− .08	− .15	− .27	+ .04	.015	6
10	− .11	+ .09	.05	+ .16	.22	− .01	.023	7
15	− .33	.00	.28	.20	.23	.35	.163	6
20	+ .18	− .02	.33	.08	− .23	− .24	.093	3
25	− .09	− .24	− .13	.02	+ .07	+ .15	.037	2
30	.39	+ .06	+ .24	+ .27	− .28	− .14	.040	2
35	− .18	− .30	− .08	− .06	− .13	− .13	− .120	2
40	+ .29	− .06	+ .56	+ .01	+ .04	+ .27	+ .185	2
45	+0.14	+0.24	−0.08	−0.04	+0.57	+0.34	+ 0.195	1

RUNS OF THE MICROSCOPES.

The following table presents for each microscope and for the mean, the *error of runs*, or the excess over *five* revolutions in the measurement of one space, or 5′, of the Circle, with the microscope micrometer, as determined on each day from several measurements.

These measurements have been made as in 1845, either of one space, or of two spaces, the divisions being placed symmetrically with reference to the zero-points of the microscopes. When the readings have been in the vicinity of 0°, 60°, &c., corrections derived from Table A. (page xii,) have been applied, and double weight given to the result.

The temperatures at which the determinations were made, are appended: and the quantities in the column of "Means" for particular periods have been reduced to a common temperature, by means of the expression,

$$R' = \overset{''}{R} + \overset{''}{0.061}\left(t_0 - \frac{t+t'}{2}\right) + \overset{''}{0.014}\,(t - t') - \overset{''}{0.036}\,(t_0 - \tau),$$

in which R′ is the reduced and R the measured *error of runs;* t_0, the temperature to which the reduction is made; t, t′ and τ, respectively the readings of the "Upper," "Lower" and "Stone" thermometers.

The discussion in the Washington Observations for 1845 (Introduction, pages cxxvii, et sub.), from which these co-efficients have been obtained, has been confirmed by a similar discussion of an extensive series of observations made upon two sets of divisions only.

Table B.

Runs of Microscopes.

DATE.	RUNS OF MICROSCOPES.							THERMOMETERS.			MEAN REDUCED TO		No. of Obs.	Observers.
1846.	A.	B.	C.	D.	E.	F.	Mean R.	Upper. t.	Lower. t′.	Stone. τ.	R′	t_0.		
	″	″	″	″	″	″	″	°	°	°	″	°		
Jan. 3	— 0.6	— 1.0	0.0	+ 1.0	+ 0.3	+ 1.0	+ 0.12	47.0	45.5	45.5	. . .	40	1	P.
5	0.3	1.1	+ 0.1	0.2	0.7	1.5	0.19	40.2	39.6	41.5	+ 0.25		5	
8	0.6	1.0	+ 0.4	0.4	0.3	+ 0.8	+ 0.06	42.8	42.8	43.6	+ 0.02		12	C.
*10	0.9	1.3	— 0.2	0.0	0.1	— 1.4	— 0.62	35.5	36.9	41.8	— 0.33		18	
11	0.9	0.8	1.0	0.9	0.7	— 1.7	0.47	40.2	38.7	39.0	0.45		3	P.
*13	1.0	1.3	0.3	0.5	0.2	0.0	0.33	35.3	35.4	39.0	0.09		5	
14	0.7	1.2	0.3	0.0	+ 0.1	+ 0.2	0.32	37.4	36.8	36.9	— 0.25		24	C.
15	0.8	1.0	1.0	+ 0.5	0.0	0.0	0.38	38.0	37.0	36.0	. . .		1	P.
18	0.9	1.5	0.2	— 0.3	— 0.3	— 0.2	0.57	30.0	30.2	40.5	+ 0.04		4	
19	1.3	1.6	0.9	+ 0.2	+ 0.1	— 0.1	0.62	30.3	30.7	35.2	— 0.22		6	
22	0.8	1.2	0.1	0.2	0.1	+ 0.1	0.31	33.3	33.8	33.3	0.39	32	8	C.
"	1.0	1.4	0.5	+ 0.2	0.0	+ 0.2	0.41	29.5	30.6	33.7	0.30		6	
23	1.2	1.7	— 0.7	— 0.3	0.0	— 0.4	0.71	29.2	29.2	33.1	0.49		17	
24	0.9	0.9	0.0	+ 0.5	0.0	+ 0.2	— 0.18	34.5	32.4	30.9	— 0.28		5	P.
26	0.0	0.5	+ 0.4	0.5	1.3	0.7	+ 0.41	46.8	43.5	37.3	+ 0.04	40	3	C.
28	0.3	1.0	+ 0.1	0.0	0.4	0.5	— 0.05	43.3	41.7	42.2	— 0.10		25	
Feb. 3	0.7	0.8	— 0.1	0.3	0.4	0.3	0.10	43.2	43.2	43.0	0.19		5	P.
4	0.6	1.2	0.0	0.5	0.6	0.3	0.06	42.4	42.3	42.7	0.10		10	
9 to 13	0.6	1.0	— 0.1	0.2	0.2	0.4	0.16	38.7	38.1	39.2	0.10		8	
18	0.4	1.2	0.0	0.3	0.2	0.1	0.17	39.7	38.5	39.6	0.11		9	
21	0.7	1.0	+ 0.2	0.2	0.0	0.2	0.18	40.0	38.5	36.8	. . .		1	C.
23	0.7	1.4	— 0.2	0.2	0.1	+ 0.1	0.33	36.8	36.1	36.5	0.23		25	
Mar. 3	0.9	0.7	0.8	0.4	0.2	— 0.2	0.32	34.2	32.2	30.7	— 0.28		3	P.
4	0.3	0.7	— 0.2	0.3	0.5	+ 0.1	— 0.05	37.0	33.1	31.5	+ 0.03		4	C.
5	0.1	0.0	+ 0.5	0.9	0.9	1.0	+ 0.52	48.0	43.3	38.0	+ 0.14		7	P.
6	0.2	0.5	0.0	0.2	0.3	0.6	+ 0.07	45.5	40.5	41.0	— 0.02		2	C.
7	0.5	1.2	0.1	0.1	0.1	0.5	— 0.15	44.6	42.4	44.0	0.19		9	
9	0.8	0.6	0.0	0.4	0.2	1.0	+ 0.03	47.6	46.9	47.0	0.15		5	P.
10	0.6	1.0	0.0	0.3	0.3	0.3	— 0.13	43.3	43.6	46.8	— 0.12		15	C.
11	— 0.1	0.4	0.6	1.0	0.1	0.9	+ 0.35	48.0	47.0	44.5	+ 0.31	50	2	P.
12	+ 0.1	0.3	0.6	0.9	0.9	0.7	+ 0.48	55.8	51.5	46.9	0.20		11	C.
14	— 0.8	0.8	0.2	0.3	0.2	0.5	— 0.06	51.2	50.2	53.8	0.03		10	
17 to 19	0.3	0.6	0.3	0.4	0.9	0.4	+ 0.18	52.8	49.3	48.2	0.09		8	P.C.
21	0.6	1.1	+ 0.3	0.5	0.4	0.3	— 0.03	49.5	48.5	56.3	0.27		11	C.
30	0.8	1.1	— 0.2	0.2	0.3	0.3	— 0.20	46.2	46.7	50.0	0.01		6	
31	— 0.6	0.8	+ 0.1	0.4	0.4	0.8	+ 0.06	47.1	47.3	48.3	0.17		12	
April 1	+ 0.1	0.3	+ 0.1	0.5	0.8	0.5	0.28	48.2	47.8	47.0	0.30		3	P.
3	— 0.5	0.7	+ 0.1	0.6	1.0	+ 0.6	+ 0.18	49.4	49.1	47.6	0.15		12	C.
"	— 0.9	1.1	— 0.1	0.4	0.1	— 0.2	— 0.30	41.5	42.4	47.5	0.10		11	
4	+ 0.6	0.3	+ 0.6	0.5	0.8	+ 0.7	+ 0.49	50.0	49.2	47.0	0.42		2	P.
6	— 0.7	0.9	+ 0.3	0.5	0.6	0.5	0.05	52.1	51.4	52.9	0.05		14	C.
9	0.7	0.8	— 0.1	+ 0.8	0.7	0.8	+ 0.12	48.7	49.0	54.0	0.33		2	P.
13	1.0	1.3	— 0.2	— 0.1	0.4	0.1	— 0.35	45.0	45.6	56.0	0.14		8	C.
16	— 0.2	— 0.6	+ 0.3	+ 0.9	1.0	0.6	+ 0.33	53.0	51.8	52.2	0.28		9	
†18	+ 0.5	+ 0.7	+ 1.4	1.3	+ 1.7	+ 1.4	+ 1.17	71.5	65.8	59.0	+ 0.40		7	
18 to 20	— 0.4	— 1.1	— 0.2	0.6	— 1.0	— 0.9	— 0.50	67.2	65.7	62.5	— 0.65	65	5	C.P.
21	0.6	1.2	0.4	0.8	1.1	0.8	0.55	69.0	66.3	63.0	0.75		7	C.
22	0.3	1.0	0.6	0.8	0.7	0.5	0.38	67.6	67.1	65.7	0.49		4	P.
23	0.5	1.3	— 0.7	0.6	1.2	1.0	0.68	65.3	64.5	65.7	0.64		6	C.
25	— 0.1	— 0.9	0.0	+ 0.6	— 0.9	— 0.5	— 0.30	75.8	71.7	69.1	— 0.50		6	

* Jan. 9 and 12, Microscope F re-adjusted. † April 18. All the Microscopes re-adjusted.

TABLE B.—Continued.

DATE.	RUNS OF MICROSCOPES.							THERMOMETERS.			MEAN REDUCED TO		No. of Obs.	Observers.
1846.	A.	B.	C.	D.	E.	F.	Mean R.	Upper. t.	Lower. t′	Stone. τ.	R′	t₀		
	″	″	″	″	″	″	″	°	°	°	″	°		
April 30	− 0.4	− 1.0	− 0.1	+ 0.7	− 1.3	− 0.6	− 0.45	68.9	64.7	60.8	− 0.65	65	6	C.
May 1	0.2	0.9	0.0	0.6	1.0	0.6	0.35	70.1	66.1	63.8	0.51		7	
2	0.7	1.3	− 0.6	0.7	1.1	1.0	0.67	65.0	63.1	65.0	0.58		8	
4	0.0	1.1	+ 0.2	1.0	1.0	0.8	0.28	70.0	67.0	63.5	. . .		1	P.
5	0.2	1.0	− 0.2	0.9	1.1	0.5	0.35	72.1	69.3	65.8	0.57		9	C.
11	1.2	1.6	0.9	0.0	1.6	1.0	1.06	58.2	59.0	64.0	0.72		10	
12	0.3	0.9	0.3	0.5	0.8	0.5	0.38	65.0	64.3	61.0	0.49		3	P.
13	0.8	0.8	0.0	0.9	1.2	0.4	0.38	70.3	68.1	64.5	0.61		12	C.
19	1.2	1.5	0.7	0.2	0.9	0.4	0.75	59.4	59.9	66.5	0.38		4	P.
20	0.9	1.5	− 0.5	0.6	1.6	1.0	0.81	63.7	62.5	63.4	0.74		12	C.
22	0.9	1.3	+ 0.4	0.9	1.2	0.5	0.43	67.9	67.0	66.0	0.53		6	
23	0.8	0.4	0.4	1.7	0.7	− 0.3	− 0.02	73.0	69.5	66.5	0.04	75	1	P.
25	0.7	0.5	0.4	1.3	0.5	+ 0.7	+ 0.12	81.3	74.0	72.0	0.05		1	
27	0.6	1.1	0.0	0.8	0.8	− 0.5	− 0.36	75.3	74.9	77.5	0.26		14	C.
June 3	0.5	0.7	0.3	1.9	0.4	− 0.5	+ 0.02	78.0	75.0	73.0	0.14		1	P.
4	0.4	1.1	0.3	1.1	0.8	+ 0.1	− 0.13	77.3	75.0	73.7	− 0.24		8	C.
6	0.5	1.1	0.1	1.1	0.4	− 0.5	0.22	69.9	70.4	75.5	+ 0.09		5	P.
15	0.6	0.8	0.0	1.0	0.9	0.4	0.28	70.9	70.0	69.0	− 0.20		18	C.
16	0.6	1.1	0.4	0.7	0.0	0.3	0.15	73.0	73.5	. .	. . .		1	P.
17	0.7	1.2	0.1	1.0	0.8	− 0.6	− 0.38	71.7	71.9	73.1	− 0.26		7	C.
18	0.3	0.3	0.8	1.3	0.1	+ 0.6	+ 0.33	74.0	74.0	73.0	+ 0.32		1	P.
19	0.6	1.0	0.2	1.0	1.0	− 0.2	− 0.26	75.9	74.4	74.6	− 0.25		8	C.
20	0.0	0.0	+ 1.3	1.9	+ 0.1	+ 0.2	+ 0.58	83.0	77.5	70.0	+ 0.16		1	
22	1.1	1.2	− 0.2	0.5	− 1.3	− 0.9	− 0.70	64.0	65.2	70.2	− 0.25		16	
23	0.5	0.7	− 0.6	1.1	0.8	+ 0.1	0.23	. .	68.5	. .	. . .		1	P.
27	− 0.2	0.8	+ 0.7	+ 1.1	1.2	− 0.4	0.13	75.0	73.0	72.8	0.12		1	C.
July 1	+ 0.8	0.4	0.3	− 0.6	0.4	+ 0.1	− 0.03	80.0	78.0	74.0	0.14	80	5	
6	− 0.3	0.4	0.3	+ 0.9	0.2	− 0.0	+ 0.04	81.4	79.6	77.9	0.05		15	
7	0.6	0.9	0.5	1.1	0.6	0.7	− 0.20	77.8	76.3	78.0	0.07		2	P.
8	− 0.3	0.6	0.4	1.1	− 0.6	0.2	− 0.03	78.7	77.5	77.0	− 0.13		10	C.
9	+ 0.2	− 0.2	0.5	1.1	+ 0.1	0.1	+ 0.27	82.0	78.0	76.0	+ 0.19		2	P.
10	+ 0.7	+ 0.3	0.9	1.6	+ 0.1	0.0	0.60	88.4	84.2	79.7	0.17		7	C.
13	− 0.2	− 0.4	0.6	1.5	− 0.4	0.3	0.14	84.9	83.5	83.0	0.02		8	
14	0.3	0.7	+ 0.2	1.3	− 0.3	0.1	+ 0.02	78.3	78.7	80.7	0.09		10	
15	0.7	0.6	− 0.2	1.2	+ 0.2	0.5	− 0.10	71.5	71.0	74.5	+ 0.22		3	P.
16	0.4	0.7	+ 0.3	1.1	− 0.9	0.7	− 0.22	72.5	71.7	71.0	− 0.06		2	C.
20	0.0	0.3	0.7	1.2	0.4	0.5	+ 0.12	75.5	72.9	69.0	0.01	75	6	
23	0.0	0.1	0.1	0.8	− 0.3	0.3	0.03	76.2	75.3	73.5	0.05		1	
24	− 0.1	− 0.3	0.7	1.0	+ 0.1	0.0	0.23	82.5	79.2	76.1	0.11		10	
25	+ 0.2	+ 0.2	0.8	1.0	− 0.7	0.1	+ 0.23	82.5	79.5	77.0	− 0.02		1	P.
26	− 0.8	− 0.3	0.8	1.4	0.8	0.1	− 0.04	76.8	76.8	. .	. . .		3	
29	0.4	0.8	0.2	1.0	0.3	0.2	− 0.09	74.9	75.3	78.2	+ 0.01		8	C.
31	0.3	− 0.4	0.0	1.3	− 0.5	0.2	+ 0.02	79.2	79.4	80.3	− 0.05		7	P.
Aug. 1	0.2	+ 0.2	0.9	1.6	+ 0.1	0.2	+ 0.40	81.0	79.5	79.0	+ 0.18		1	C.
3	0.8	− 1.0	0.3	1.0	− 0.4	0.4	− 0.21	72.6	73.5	75.7	− 0.07		19	
4	0.3	0.2	0.1	1.4	0.3	0.2	+ 0.17	75.7	75.1	74.2	+ 0.13		6	P.
5	0.0	0.3	0.6	1.4	0.1	− 0.1	0.26	81.2	78.6	75.8	0.03		12	C.
6	0.0	0.0	0.6	1.4	0.5	+ 0.2	+ 0.29	82.6	80.4	78.7	0.18	80	6	P.
7	− 0.6	0.8	0.0	1.3	0.2	− 0.2	− 0.08	76.6	77.6	80.6	0.11		5	C.
8	+ 0.1	0.0	0.0	1.3	0.2	+ 0.1	+ 0.22	82.9	81.5	80.5	0.12		4	P.
10	0.4	0.7	+ 0.3	1.0	0.4	− 0.3	− 0.08	76.3	77.3	81.2	+ 0.15	80	10	C.
11	0.6	1.0	− 0.4	1.2	0.7	+ 0.1	0.23	73.5	75.0	75.5	− 0.02		1	P.
12	0.5	1.0	+ 0.5	1.3	0.0	− 0.1	+ 0.03	75.7	76.1	77.4	+ 0.18		7	C.
18	− 0.8	− 0.9	− 0.1	+ 1.1	− 0.5	− 0.1	− 0.22	73.8	74.8	79.0	+ 0.08		8	

TABLE B.—Continued.

[illegible]	[illegible]NS OF MICROSCOPES.							THERMOMETER.			MEAN REDUCED. TO.		No. of Obs.	Observers.
	A.	B.	C.	D.	E.	F.	Mean R.	Upper. t.	Lower. t′	Stone. τ.	R′	t_0		
				″	″	″	″	°	°	°	″	°		
[illegible]	[illegible]	0.3	+ 0.3	+ 1.3	— 0.1	+ 0.1	+ 0.20	78.8	78.5	77.2	+ 0.19	80	6	P.
[illegible]	[illegible]	0.5	0.3	1.3	0.0	+ 0.3	0.23	77.5	77.4	78.7	0.36		6	C.
[illegible]	[illegible]	0.1	0.3	1.6	0.3	— 0.3	0.16	80.3	80.0	79.0	0.12		3	P.
[illegible]	[illegible]	0.3	0.6	1.0	0.5	+ 0.1	0.05	78.2	79.0	83.0	0.24		3	C.
[illegible]	[illegible]	0.2	0.4	1.3	0.0	+ 0.3	+ 0.26	80.3	80.6	80.7	0.26		5	P.
[illegible]	[illegible]	1.1	0.0	1.1	0.4	— 0.1	— 0.21	71.9	72.7	78.1	+ 0.18		4	C.
[illegible]	0.5	0.6	0.5	1.0	0.4	+ 0.2	+ 0.03	77.6	77.0	78.0	— 0.11	70	1	
[illegible]	0.2	0.4	0.4	1.0	0.5	— 0.6	— 0.05	70.5	69.8	73.0	+ 0.06		1	
[illegible]	+ 0.2	+ 0.3	0.0	2.2	0.0	+ 0.3	+ 0.50	72.5	72.0	73.0	+ 0.47		1	P.
[illegible]	0.5	0.6	0.1	0.9	0.2	— 0.5	— 0.14	73.9	71.8	70.5	— 0.26		6	
[illegible]	0.5	0.5	0.1	1.1	0.6	— 0.5	— 0.14	74.5	72.4	70.5	— 0.30		6	
21	+ 0.2	0.2	0.9	1.5	0.1	+ 0.4	+ 0.45	77.0	72.8	69.0	+ 0.18		6	C.
24	0.4	0.6	0.7	1.4	— 0.4	0.0	0.11	71.1	69.6	69.5	0.08		4	P.
25	0.1	0.4	+ 0.8	1.6	+ 0.2	0.3	+ 0.40	75.2	73.2	70.6	0.19		21	C.
28	0.6	0.9	— 0.2	0.9	+ 0.2	0.0	— 0.10	62.7	63.5	68.5	+ 0.13	65	2	P.
29	0.7	1.1	+ 0.1	1.2	— 0.3	+ 0.1	— 0.13	63.3	63.8	64.8	— 0.05		12	C.
30	0.4	0.6	0.2	2.0	0.1	0.0	+ 0.18	67.0	65.0	64.0	+ 0.11		1	P.
Oct. 1	0.7	0.5	0.2	1.1	0.0	— 0.3	— 0.04	67.1	66.0	65.0	— 0.12		6	C.
5	0.9	0.9	0.3	0.9	0.4	0.0	— 0.17	61.6	62.6	64.7	— 0.01		8	
6	0.3	0.6	0.4	1.0	0.1	— 0.2	+ 0.04	64.4	63.9	62.9	+ 0.03		5	P.
7	0.4	0.4	0.4	1.3	0.3	+ 0.1	+ 0.12	66.6	65.8	64.2	+ 0.03		4	C.
8	0.6	0.7	0.0	0.9	0.4	0.0	— 0.13	69.5	67.5	66.0	— 0.27		2	P.
9	0.5	0.8	+ 0.4	1.2	0.3	0.0	0.00	68.5	67.8	67.7	0.09		9	C.
10	1.3	1.3	— 0.2	1.0	0.3	— 0.4	0.41	58.8	59.9	66.1	0.02		5	P.
14	0.4	0.9	— 0.1	1.0	0.2	+ 0.1	— 0.09	61.2	60.0	60.7	0.10	60	4	P.C.
16	0.5	0.7	+ 0.5	1.3	0.2	— 0.2	+ 0.03	61.7	58.0	55.7	— 0.06		6	P.
"	0.0	0.3	0.5	1.1	0.1	0.1	0.18	61.7	58.0	55.7	+ 0.09		6	C.
"	0.7	1.2	0.8	2.0	0.0	+ 0.4	0.22	64.4	62.8	57.0	— 0.08		1	
17	0.2	0.6	0.3	1.2	0.2	— 0.4	+ 0.02	67.0	62.0	59.5	0.17		1	P.
19	1.7	1.9	0.0	0.8	1.3	0.7	— 0.80	51.8	51.5	57.3	0.78	50	4	C.
23	1.1	1.0	0.0	1.2	— 0.6	0.3	— 0.31	53.0	52.3	51.4	0.41		11	
24	0.6	0.9	+ 0.2	1.7	+ 0.1	0.4	+ 0.02	56.2	54.2	53.0	0.16		2	
25	1.1	1.1	— 0.6	1.9	— 0.3	— 0.4	— 0.27	51.7	50.5	. .	. . .		1	
26	0.4	0.7	+ 0.5	1.2	0.0	+ 0.3	+ 0.15	55.6	53.1	51.0	0.06		3	
28	1.4	1.5	— 0.5	0.5	1.0	— 0.6	— 0.75	46.6	47.5	55.9	0.37		10	
29	0.9	0.8	0.1	1.3	0.6	— 0.1	— 0.20	52.5	52.2	52.7	— 0.25		6	
Nov. 9	0.7	0.7	— 0.1	1.7	0.2	+ 0.3	+ 0.05	64.4	64.2	68.0	+ 0.07	60	4	P.
11	0.7	0.8	+ 0.8	1.5	0.1	+ 0.2	+ 0.14	68.5	65.5	65.3	— 0.04		12	C.
14	0.9	0.8	+ 0.2	1.2	0.3	— 0.3	— 0.14	60.0	58.8	60.0	— 0.09		12	
16	0.7	0.9	— 0.1	0.8	0.3	0.0	0.20	53.4	54.0	56.0	+ 0.03		3	P.
17	0.8	0.9	+ 0.5	1.4	0.3	0.0	0.02	59.3	56.4	55.5	— 0.01		12	C.
20	0.8	1.2	0.4	1.0	0.2	0.2	0.17	57.4	55.6	55.6	0.09		12	
"	0.8	1.4	+ 0.1	0.6	0.0	0.8	0.38	51.0	51.5	55.6	0.26	50	1	P.
21	1.6	1.6	— 0.1	0.9	1.0	0.6	0.67	49.8	48.5	53.3	0.48		1	C.
"	1.0	1.1	+ 0.2	0.9	0.2	0.3	0.25	54.5	53.0	53.8	0.32		12	
28	1.2	1.4	0.0	1.1	1.0	0.2	0.45	48.0	45.5	45.2	0.37		4	
30	1.2	1.4	— 0.8	0.6	0.6	0.6	0.67	45.9	45.8	50.0	0.41		7	
Dec. 3	0.8	0.7	— 0.2	1.8	0.5	0.0	0.07	53.2	51.0	50.0	0.17	50	3	P.
4	1.1	1.1	+ 0.1	0.9	0.8	0.4	0.39	50.4	49.7	50.3	0.40		7	C.
11	1.6	1.0	— 0.4	0.0	0.6	1.0	0.77	48.5	48.5	47.5	0.77		1	P.
12	1.2	1.1	0.3	1.0	0.8	0.2	0.44	44.6	43.9	47.0	0.18		4	
14	1.3	1.4	0.3	0.7	1.0	0.5	0.63	43.9	43.5	45.0	0.77	40	10	C.
15	1.3	1.1	0.0	0.2	0.6	0.0	0.47	39.5	42.0	42.0	0.47		1	P.
16	— 1.7	— 1.0	— 1.0	+ 1.1	— 1.0	— 1.9	— 0.92	. .	37.0	38.0	— 0.80		1	

Table B.—Continued.

DATE. 1846.	RUNS OF MICROSCOPES.							THERMOMETERS.			MEAN REDUCED TO		Observers.	No. of Obs.
	A.	B.	C.	D.	E.	F.	Mean R.	Upper. t.	Lower. t'	Stone. τ.	R'	t_0		
	"	"	"	"	"	"	"	°	°	°	"	°		
Dec. 18	— 1.0	— 1.0	0.0	+ 0.5	— 0.8	— 1.2	— 0.58	45.5	43.0	42.0	— 0.73	40	1	P.
21	1.6	1.6	— 0.5	0.7	1.0	0.2	0.70	40.0	39.5	40.0	0.67		2	
22	2.0	2.1	0.8	0.2	0.7	0.3	0.95	37.5	37.0	39.0	0.84		1	
23	1.1	1.7	0.7	0.4	0.9	0.8	0.81	40.7	39.0	39.5	0.79		9	C.
* "	1.9	1.9	0.6	0.4	1.5	1.0	1.08	32.7	33.4	39.1	0.70		7	
26	1.6	1.1	— 0.2	1.2	0.6	0.8	0.52	41.0	40.0	40.0	0.50		2	P.
28	1.0	1.0	+ 0.8	1.3	0.3	0.1	0.05	53.2	47.7	46.0	0.17	50	6	C.
29	1.4	1.1	0.3	0.7	1.0	0.6	0.52	49.0	46.7	47.8	0.44		7	
29	1.1	1.2	0.4	1.1	— 0.4	— 0.1	0.22	50.7	47.7	48.0	0.20		20	
30	0.7	1.4	0.1	0.8	+ 0.3	+ 0.1	— 0.13	50.8	49.5	48.0	0.19		3	P.
1847. Jan. 1	— 0.6	— 0.7	+ 0.7	+ 1.4	— 0.5	+ 0.2	+ 0.11	57.8	54.4	51.5	— 0.16		11	C.

* Dec. 23. Microscope C re-adjusted.

The mean values of R' for special periods are presented in the following table.

Table C.

Runs of Microscopes—Means for particular periods.

1846.	R'	Temp. of Circle and Stone. t_0	No. of Observations.	1846.	R'	Temp. of Circle and Stone. t_0	No. of Observations.
	"	°			"	°	
Jan. 3 to Jan. 8	+ 0.06	40	17	July 1 to July 18	0.00	80	64
10 11	— 0.35	"	21	19 31	— 0.04	75	33
12 20	0.19	"	39	Aug. 1 Aug. 5	0.00	"	38
21 25	0.41	32	36	6 20	+ 0.14	80	41
26 Feb. 6	0.10	40	43	31 Sept. 12	0.24	"	27
Feb. 7 28	0.18	"	42	Sept. 13 26	+ 0.05	70	46
Mar. 1 Mar. 10	— 0.09	"	45	26 Oct. 12	— 0.02	65	54
11 31	+ 0.15	50	60	Oct. 13 18	0.02	60	26
Apr. 1 Apr. 6	0.13	"	42	19 31	0.37	50	36
7 18	+ 0.33	"	18	Nov. 1 Nov. 20	0.04	60	55
18 30	— 0.65	65	34	20 Dec. 12	0.35	50	40
May 1 May 22	0.60	"	72	Dec. 13 23	0.76	50	25
23 June 30	— 0.20	75	81	23 Jan. 1	— 0.25	50	56

In the measurement of two spaces, one in *advance* of, the other *retrograde* from the zero-points of any microscope, (using the terms *advance* and *retrograde* with reference to the order of reading the microscopes,*) the two measurements have been found to differ considerably, indicating that the plane of motion of the micrometers, or the microscopes themselves are inclined to their normal positions. The following table presents, under the designation, dR, the differences of the *advance* from the *retrograde* measurements, as derived mainly from readings at 180° 0′ and 0° 15′, corrected by means of Table A, (page xii) for errors of graduation. Thus, R_a, representing the error of runs from the *advance* measurement; R_r, that from the *retrograde;*

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* An *advance* movement of a micrometer carries the cross wires towards the *preceding*, a *retrograde* movement towards the *following* line of division of the Circle. Care is taken in these measurements to eliminate loss of run, or *dead point* of the micrometer wire: in general, however, it has been insensible.

$$dR = R_a - R_r.$$

TABLE D.

dR.

DATE.	Circle Readings.	A.	B.	C.	D.	E.	F.	Mean.		No. of determinations.
	° ′	″	″	″	″	″	″	″	″	
1846. Jan. 8, to April 18 .	180 0	— 0.2	— 0.1	— 0.2	— 0.3	— 0.9	— 0.8	— 0.42	— 0.40	20
	0 15	— 0.1	0.7	0.1	0.2	0.7	0.2	.33		5
Apr. 18, to July 18 .	180 0	+ 0.2	0.3	0.1	1.4	0.8	0.8	.53	.49	21
	0 15	+ 0.1	0.2	0.2	0.8	0.5	0.6	.37		7
July 18, to Dec. 23 .	180 0	— 0.2	0.3	0.1	1.2	0.8	0.8	.57	.55	19
	0 15	0.0	0.5	1.2	0.5	0.0	0.6	.47		4
Dec. 23, to Apr. 21, 1847	180 0	0.0	0.5	0.0	1.4	1.1	0.9	.65	— 0.56	21
	Miscellaneous.	0.0	— 0.2	— 0.5	— 0.5	— 0.6	— 0.6	— 0.41		27

The periods are those, during which the microscopes remained undisturbed.

Telescope Micrometer.

The *head* of the telescope micrometer has been subjected to examination, by means of four equidistant pointers, and the following corrections of a reading with a single pointer obtained from several sets of accordant observations, made in 1847 and 1848.

TABLE E.

Corrections to be applied to readings of telescope micrometer, on account of eccentricity of the micrometer head.

Mic. readings.	Correction.	Mic. readings.	Correction.
	r.		r.
.00	0.0000	.50	—0.0023
.05	— 05	.55	19
.10	10	.60	14
.15	15	.65	08
.20	20	.70	— 01
.25	24	.75	+ 04
.30	28	.80	09
.35	29	.85	10
.40	28	.90	09
.45	27	.95	+ 06
.50	— .0023	.00	.0000

The following observations have been made for determining the equivalent of one revolution of the telescope micrometer. Except in the earlier determinations, the largest practicable range has been made use of, on account of the employment of a wide extent of field in the catalogue observations.

As in the former year, these determinations have been made with the aid of the collimating eye-piece and basin of mercury.

In these observations, representing by C the "Circle Readings," corrected for runs and errors of graduation from Table A, (page xii,)—by m, the corresponding "Micrometer Readings," when the wire employed is moved into coincidence with its reflected image, corrected by means of Table E, (page xviii,)—by n, the number of positions;—and by dm, a small quantity applied so as to make the several values of μ, multiples of $2^{r}.39$, the equivalent nearly of $2' \, 30''$; then in each series:

$$\mu = m - \frac{1}{n}[m] + dm.$$

$$a = C - \frac{1}{n}[C] + dm \times 62''.78:$$

and the relation of the micrometer to the field of view, except so far as irregularities of the screw are involved, is expressed by the equation;

$$\mu r + \left(\mu^{2} - \frac{1}{n}[\mu^{2}]\right) \Delta r + \mu^{3} \Delta' r + \dots = a.$$

In which r represents the *equivalent of one revolution* in the middle of the field or near the *fixed wire;* and from which $\Delta' r$, and the co-efficients of the higher powers of μ may be omitted, as their introduction has been found not to diminish the probable errors of the results. Δr, so far as dependant upon an inclination of the plane of motion to the axis of the Telescope, is liable to variations at every unclamping of the Telescope from the rim of the Circle.

Each set of observations presents a symmetrical series, so that $\frac{1}{n}[m]$ is nearly 30^{r}. The several values of r and Δr are obtained by combining the symmetrical terms.

The micrometer wire employed has been the middle one, or that designated as *wire* 3; except in the observations on March 18, when several wires were brought into coincidence with their reflected images; all the readings however have been reduced by ascertained differences, to what they would have been if *wire* 3 had been used. In several cases, the *fixed wire* has been employed, and the coincidence of *wire* 3 with the *fixed wire*, quoted.

TABLE F.

Value of Telescope Micrometer.

DATE. 1846.	Corrected Circle Reading. C.	No. of Read's	Corrected Mic. Reading. m.	No. of Read's	Equations. μ	$\frac{\mu^{2} - \frac{1}{n}[\mu^{2}]}{2.39^{2}}$	a	Values of r and Δr.
	° ′ ″		r.				′ ″	″
Jan. 23	179 50 1.05	1	20.4858	10	$-9.56r$	$+ 5.3(\Delta r)^{*} =$	-10 0.58	$2\mu = 19.12$ | $r = 62.855$
	180 0 1.67	6	30.0564	12	0.00	-10.7	-0 0.63	$(h = 4)$
	180 10 2.81	1	39.6052	10	$+9.56$	$+ 5.3$	$+10$ 1.21	
	180 0 1.84		30.0491					″ $10.7 \times 2.39^{2} \Delta r = +0.63$
	$(n = 3.)$							$\Delta r = +0.0103$

$^{*}(\Delta r) = 2.39^{2} \Delta r.$

TABLE F.—Continued.

DATE. 1846.	Corrected Circle Reading. C.	No. of Read's	Corrected Mic. Reading. m.	No. of Read's	Equations.			Values of r and Δr.
					μ	$\frac{\mu^2-\frac{1}{n}[\mu^2]}{2.39^2}$	a	
	° ′ ″		r.				′ ″	″
Mar. 18	179 49 56.01	2	20.4396	10	$-9.56r$	$+8\ (\Delta r) =$	$-9\ 59.61$	$2\mu = 19.12$ $r = 62.736$
	54 56.41	2	25.2288	10	-4.78	-4	$-4\ 59.79$	9.56 .704
	59 55.27	6	29.9970	10	0.00	-8	$-0\ 0.14$	$(h = 4.5)$ $r = 62.730$
	180 4 55.64	2	34.7852	10	$+4.78$	-4	$+4\ 59.66$	″
	9 54.15	2	39.5376	10	$+9.56$	$+8$	$+9\ 59.90$	$16 \times 2.39^2\ \Delta r = +0.29$
	179 59 55.50		29.9976					$8 \quad = -\ .13$
	$(n = 5.)$							$8 \quad = +\ .14$
								$(19.6) \quad \Delta r = +0.0021$
								″
April 16	179 50 1.94	1	20.4578	10	$-9.56r$	$+5.3(\Delta r) =$	$-9\ 59.66$	$2\mu = 19.12$ $r = 62.733$
	0 0.62	8	30.0045	8	0.00	-10.7	$-0\ 0.14$	$(h = 4.)$
	180 9 58.76	1	39.5357	10	$+9.56$	$+5.3$	$+9\ 59.80$	″
	180 0 0.44		29.9993					$10.7 \times 2.39^2\ \Delta r = +0.04$
	$(n = 3.)$							$\Delta r = +0.0020$
								″
April 25	179 50 1.87	2	20.4373	10	$-9.56r$	$+6\ (\Delta r) =$	$-10\ 0.19$	$2\mu = 19.12$ $r = 62.765$
	55 1.40	1	25.1996	10	-4.78	-6	$-4\ 59.55$	9.56 .701
	5 3.02	1	34.7946	10	$+4.78$	-6	$+4\ 59.87$	$(h = 4.5)$ $r = 62.752$
	180 10 3.17	2	39.5769	10	$+9.56$	$+6$	$+9\ 59.88$	″
	180 0 2.365		30.0021					$12 \times 2.39^2\ \Delta r = -0.31$
	$(n = 4.)$							$12 \quad = -0.32$
								$(17) \quad \Delta r = -0.0046$
								″
May 22	179 50 3.38	2	20.4480	10	$-9.56r$	$+8\ (\Delta r) =$	$-9\ 59.68$	$2\mu = 19.12$ $r = 62.748$
	55 3.49	2	25.2319	10	-4.78	-4	$-4\ 59.82$	9.56 .724
	180 0 2.42	6	30.0038	12	0.00	-8	$-0\ 0.39$	$(h = 4.5)$ $r = 62.743$
	5 1.73	2	34.7696	10	$+4.78$	-4	$+4\ 59.82$	″
	180 10 2.15	2	39.5524	10	$+9.56$	$+8$	$+10\ 0.07$	$16 \times 2.39^2\ \Delta r = +0.39$
	180 0 2.63		30.0011					$8 \quad = \quad .00$
								$8 \quad = +0.39$
	$(n = 5.)$							$(19.6) \quad \Delta r = +0.0064$

TABLE F.—Continued.

DATE. 1846.	Corrected Circle Reading. C.	No. of Read's	Corrected Mic.Reading. m.	No. of Read's ′	Equations.			Values of r and Δr.	
					μ	$\frac{\mu^2-\frac{1}{n}[\mu^2]}{2.39^2}$	a		
	° ′ ″		r.				′ ″		″
June 19	179 50 2.93	2	20.4490	10	− 9.56r	+ 8	(Δr) = −10 0.11	2 μ = 19.12	r = 62.774
	54 59.92	2	25.1755	10	− 4.78	− 4	4 59.76	9.53	.735
	180 0 2.66	6	30.0066	16	0.00	8	− 0 0.24	(h = 4.5)	r = 62.766
	5 0.19	2	34.7437	10	+ 4.78	− 4	+ 4 59.99	16 × 2.39²	″ Δr = +0.01
	10 1.27	2	39.5389	10	+ 9.56	+ 8	+10 0.12	8	= − .23
	180 0 1.39		29.9827					8	= + .24
	(n = 5.)							(19.6)	Δr = +0.0001
									″
Nov. 11	179 47 26.98d*	4	18.0700	8	−11.95r	+14	(Δr) = −12 29.57	2 μ = 23.90	r = 62.746
	49 55.45	4	20.4373	8	9.56	+ 5	9 59.72	19.12	.738
	52 26.83d	4	22.8503	8	7.17	− 2	7 29.78	14.34	.734
	54 54.86	4	25.2166	8	4.78	7	5 0.26	9.56	.749
	27 23.69d	4	27.5848	8	− 2.39	10	− 2 30.07	4.78	.791
	180 2 28.29d	4	32.4360	8	+ 2.39	10	+ 2 30.07	(h = 7.4)	r = 62.7426
	4 56.24	4	34.8005	8	4.78	7	4 59.62	28 × 2.39²	″ Δr = +0.48
	7 27.32d	4	37.2043	8	7.17	− 2	7 29.83	10	= + .11
	9 58.19	4	39.6097	8	9.56	+ 5	9 59.83	4	= − .05
	12 26.91d	4	41.9727	8	+11.95	+14	+12 30.05	14	= + .64
	179 59 56.48		30.0182					20	= .00
	(n = 10.)								
	* d, Double readings.							(38.7)	Δr = +0.0027
									″
Nov. 14	180 7 28.33d	4	18.0760	8	−11.95r	+14	(Δr) = −12 29.92	2 μ = 23.90	r = 62.766
	9 56.91	4	20.4478	8	9.56	+ 5	10 0.20	19.12	.767
	12 27.97d	4	22.8511	8	7.17	− 2	7 29.97	14.34	.767
	14 59.12	4	25.2633	8	4.78	7	5 0.21	9.56	.754
	17 29.36d	4	27.6528	8	− 2.39	10	− 2 29.94	4.78	.812
	22 27.52d	4	32.3995	8	+ 2.39	10	+ 2 30.30	(h = 7.4)	r = 62.7667
	24 58.83	4	34.8198	8	4.78	7	4 59.72	28 × 2.39²	″ Δr = +0.28
	27 27.45d	4	37.1815	8	7.17	− 2	7 30.11	10	= − .29
	29 58.07	4	39.5845	8	9.56	+ 5	9 59.91	4	= − .14
	32 29.69d	4	41.9957	8	+11.95	+14	+12 30.20	14	= + .49
	180 19 58.325		30.0272					20	= − .36
	(n = 10.)							(38.7)	Δr = +0.0005

TABLE F.—Continued.

DATE. 1846.	Corrected Circle Reading. C.	No. of Read's	Corrected Mic. Reading. m.	No. of Read's	Equations.			Values of r and Δr.	
					μ	$\frac{\mu^2-\frac{1}{n}[\mu^2]}{2.39^2}$	a		
	° ′ ″		r.				″		″
Nov. 17	179 27 30.87d	4	18.0886	8	−11.95r	+14	(Δr) = −12 29.89	2μ = 23.90	r = 62.765
	29 56.41	4	20.4117	8	9.56	+ 5	10 0.16	19.12	.765
	32 29.14d	4	22.8342	8	7.17	− 2	7 29.47	14.34	.720
	34 55.80	4	25.1825	8	4.78	7	5 0.19	9.56	.757
	37 28.91d	4	27.6193	8	− 2.39	10	− 2 30.02	4.78	.753
	42 31.28d	4	32.4378	8	+ 2.39	10	+ 2 29.94	(h = 7.4)	r = 62.7569
	44 58.05	4	34.7790	8	4.78	7	4 59.77		″
	47 30.09d	4	37.1989	8	7.17	− 2	7 29.94	28 × 2.39²	Δr = +0.30
	49 59.24	4	39.5758	8	9.56	+ 5	9 59.91	10	= − .25
	52 29.84d	4	41.9708	8	+11.95	+14	+12 30.19	4	= − .47
	179 39 58.96		30.0099					14	= + .42
								20	= + .08
	(n = 10.)							(38.7)	Δr = +0.0013
									″
Dec. 29	179 47 34.15d	4	18.0613	8	−11.95r	+14	(Δr) = −12 29.68	2μ = 23.90	r = 62.755
	50 1.9	4	20.4002	8	9.56	+ 5	9 59.53	19.12	.750
	52 36.13d	4	22.8764	8	7.17	− 2	7 29.90	14.34	.734
	55 1.74	4	25.1965	8	4.78	7	4 59.90	9.56	.737
	57 33.50d	4	27.6208	8	− 2.39	10	− 2 30.30	4.78	.678
	130 2 33.45d	4	32.4063	8	+ 2.39	10	+ 2 29.31	(h = 7.4)	r = 62.7474
	5 1.99	4	34.7641	8	4.78	7	4 59.87		″
	7 33.13d	4	37.1749	8	7.17	− 2	7 29.70	28 × 2.39²	Δr = +0.48
	10 3.52	4	39.5622	8	9.56	+ 5	10 0.26	10	= + .73
	12 34.33d	4	41.9667	8	+11.95	+14	+12 30.16	4	= + .20
	180 0 3.30		30.0029					14	= + .03
								20	= + .99
								(38.7)	Δr = +0.0049

The observations from March 18 to June 19 give Δr = +0.0031″ (h = 39.5)
" " " Nov. 11 to Dec. 31 " Δr = +0.0023 (h = 77.4)
Mean result . . Δr = +0.0025 (h = 87.0)

POSITIONS OF THE FIXED AND MICROMETER WIRES, RELATIVE TO EACH OTHER AND TO THE MERIDIAN.

On almost every day of observation, the *coincidence* of micrometer *wire* 3 with the *fixed wire* has been determined from six or eight contacts, (alternately on each side,) at the *vertical wire IV.* The mean of the "Micrometer Readings" for such coincidence is given in the margin of the left-hand page of the printed observations, with the day and sidereal hour at which each determination was made.

With almost equal frequency, the *coincidences* at wires *I* and *VII* have also been observed. Half the difference of these, or ½ [(*VII*) — (*I*)], obtained from all the determinations of the particular periods, is presented in the following table, constituting the reduction to parallelism with the *fixed wire*, of observations made with micrometer *wire* 3, at the *vertical wire I.* It is given in parts of the micrometer, and with the sign with which it is to be applied to the micrometer readings.

The same table also contains the reductions to parallelism with the horizon, both for *wire* 3, and the *fixed wire.* They are derived from observations, particularly of Polaris, where several bisections have been made at the same culmination; and are the corrections to be applied to the readings of the micrometer or Circle, according to the terms in which they are expressed, when the observation has been made at the *vertical wire I.* During March, the adjustments and changes were so frequent, that no satisfactory determinations were made.

Table G.

Reductions at Vertical wire I,

To parallelism with - -		FIXED WIRE.	HORIZON.		
of observations with -		*Wire* 3.	*Wire* 3.		*Fixed Wire.*
		$d'm^{I}_{3}$	dm^{I}_{3}	dc^{I}_{3}	dc^{I}
		r.	r.	″	″
Jan. 8	to Jan. 31	— 0.0065	— 0.0029 =	+ 0.18	— 0.23
Feb. 1	Feb. 25		113	0.71	+ 0.30
March 30	April 3	. . . . .	. . . .	. . .	0.45
April 4	" 23	+ 0.0045	+ 0.0011	— 0.07	0.21
" 24	May 14		35	0.22	0.06
May 15	June 8	40	15	0.09	+ 0.16
June 9	" 30	30	58	0.37	— 0.18
July 1	July 31	25	15	0.09	+ 0.07
Aug. 1	Aug. 31	25	33	0.21	— 0.05
Sept. 1	Oct. 5	40	18	0.11	+ 0.14
Oct. 6	Nov. 20	47	57	0.35	— 0.06
Nov. 21	Dec. 31	+ 0.0010	+ 0.0077	— 0.48	— 0.42

The *coincidences* of the other micrometer wires (except 5) at the vertical wires *I*, *IV* and *VII*, have also at several times been determined. The differences of the coincidences for *wire* 3 from these, or $dm_w^v = (3)^v - (w)^v$, (v symbolizing the vertical wire, and w the micrometer wire,) are given in the following table. They constitute the reductions of the micrometer readings for observations made with the several wires, to what they would have been, had the observations been made with *wire* 3.

TABLE H.

Reduction of micrometer observations, dm_w^v.

FOR MIC. WIRE.	1.			2.			4.		
At vertical wire . . .	*I.*	*IV.*	*VII.*	*I.*	*IV.*	*VII.*	*I.*	*IV.*	*VII.*
	dm_1^I.	dm_1^{IV}.	dm_1^{VII}.	dm_2^I.	dm_2^{IV}.	dm_2^{VII}.	dm_4^I.	dm_4^{IV}	dm_4^{VII}
	r	r	r	r	r	r	r	r	r
1846. April 16 . .	+0.0122	+0.0161	+0.0202	—0.0403	—0.0312	—0.0255	+0.0114	+0.0250	+0.0437
24 . .	116	188	215	380	306	237	090	184	333
July 20 . .	125	182	216	378	302	245	122	276	403
Nov. 21 . .	072	083	115	383	346	282	107	225	362
MEAN	+0.0110	+0.0149	+0.0187	—0.0386	—0.0316	—0.0255	+0.0106	+0.0244	+0.0384

It was found impracticable to obtain the reductions for *wire* 5 in this way, and therefore, except in the earlier catalogue observations, the use of that wire has been dispensed with.

Similar reductions for several of the wires, which were removed, are given in the margin of the printed observations, in connection with the observations in which they were employed.

PROBABLE ERRORS AND WEIGHTS OF OBSERVATIONS.

The desirableness of assigning appropriate weights to the several classes of observations, particularly to observations on Polaris, and the Sun and Moon, has led to a careful revision of the investigation of *probable errors*, given in the appendix to the observations for 1845, (p. 90 et sub.) Some of the results differ from those there stated, partly from being derived from more extensive series of observations; but chiefly from a different and more accurate disposition of the quantities. The sources of disagreement in observations of a star made on *different days*, such as undetected changes in the instrument, and an imperfect acquaintance with the actual condition of the atmosphere, as affecting refraction, were in a measure overlooked. They occasion the error peculiar to each culmination, which cannot be eliminated by multiplying observations at the same culmination, and which may conveniently be called the *diurnal error*. To such sources, rather than to the causes stated, is to be mainly attributed the large *residual probable error* of a single observation of Polaris, which appears on page 94 (app. Wash. obs. 1845.)

In the following discussion the same notation, which is used in the investigation referred to, is employed as far as practicable, and the greater part of that work is incorporated in this.

1.... $\varepsilon = \pm\ 0''.055$, the *probable error of one Circle reading* (mean of the six microscopes,) derived from 832 discrepancies in 138 groups, as follows:—six sets of measurements for runs, after deducting the ascertained corrections for errors of graduation, furnish forty errors of reading, which give $\varepsilon = \pm\ 0''.082$: Table A, *(app. Wash. Obs.*, 1845, p. 92,) affords 72 discrepancies in 12 groups, the readings in each group made on the same lines of division and with the Circle in a fixed position; these give $\varepsilon = \pm\ 0''.043$: 40 determinations of the Nadir Point furnish 720 reductions of each pair of opposite microscopes to the mean of the six, or 720 errors of reading in 120 groups, which give $\varepsilon = \pm\ 0''.055$.

2.... $\varepsilon_1 = \pm\ 0''.072$, the *probable accidental error of one set of graduations* (the mean of the six which are at the same time under the six microscopes,) derived as follows: the corrections for 15 sets of graduations in Table A (page xii) give $\varepsilon_1 = \pm\ 0''.070$: the corrections for 16 sets in Table A′ (page xiii) give $\varepsilon_1 = \pm\ 0''.072$: Table A *(app. Wash. Obs.*, 1845, p. 92) gives $\sqrt{(\varepsilon\varepsilon + \varepsilon_1\varepsilon_1)} = \pm\ 0''.093$; whence $\varepsilon_1 = \pm\ 0''.075$.

3.... 137 determinations of the Nadir Point furnish 836 differences of each Circle reading from the mean of the set to which it belongs, which give $\eta_2 = \sqrt{(\varepsilon\varepsilon + \varepsilon_2\varepsilon_2)} = \pm\ 0''.200$; whence $\varepsilon_2 = \pm\ 0''.192$, *the probable error of one coincidence of the fixed wire with its image* in determining the Nadir Point.

4.... 233 observations of Polaris at 45 culminations, each observation consisting of *one* bisection of the star with the *fixed wire* between *vertical wires III* and *V*, accompanied with one Circle Reading—furnish from the differences of the result of each from the mean of its group, $\eta_3 = \sqrt{(\varepsilon\varepsilon + \varepsilon_3\varepsilon_3)} = \pm\ 0''.310$; whence $\varepsilon_3 = \pm\ 0''.305$, the *probable error of one bisection of a star with the fixed wire*, (including the irregularity in the action of the clamps.)

5.... $\varepsilon_4 = \pm\ 0''.246$, *the probable error of one bisection of a star with the micrometer wire*, (involving to some extent irregularities in the action of the micrometer screw;) obtained from 600 bisections of Polaris in 98 groups, all in each group having been made with the Circle in a fixed position.

6.... $\varepsilon_5 = \pm\ 0''.093$, *the probable error of one coincidence of a micrometer wire with the fixed wire*, from 90 micrometer readings in 19 groups, each reading for such coincidence being the mean for the two contacts on opposite sides of the wires.

7.... ε_6, representing the probable error peculiar to each culmination or *the diurnal probable error for observations with the fixed wire*, and $\eta = \sqrt{(\varepsilon\varepsilon + \frac{1}{6}\eta_2\eta_2 + \varepsilon_3\varepsilon_3 + \varepsilon_6\varepsilon_6)} = \sqrt{(0''.1027 + \varepsilon_6\varepsilon_6)}$ representing *the probable error of one observed culmination of a star*, each observed culmination combining *one* bisection with the *fixed wire*, *one* Circle Reading and *six* observations in the determination of the Nadir Point;

174 obs'd culm'ns of	11 stars, whose Mn. Z. D. =	5°, give $\eta =$	$\pm\ 0''.458$, and $\varepsilon_6 =$	$\pm\ 0''.327$
86	12	15	.489	.369
137	13	26.2	.471	.345
98	12	34.6	.522	.412
36	4	47.0	.676	.595

53 obs'd culm'ns	of Polaris whose Mn. Z. D. =	51°, give $\eta = \pm 0''.530$, and		$\epsilon_6 = \pm 0''.422$
57	8 stars,	54.2	.542	.437
51	5	65.6	.69	.61
16	2	75.5	.70	.62
6	1	85.0	1.13	1.08

all the observations of one star depending upon the same graduations of the Circle.

The preceding values of η and ϵ_6 are nearly represented by the following table:

Zen. Dist.	η	ϵ_6
0°	± 0″.46	± 0″.33
10	.47	.34
20	.48	.36
30	.50	.38
40	.52	.41
50	.55	.45
60	.60	.51
70	.70	.62
80	.87	.80

8....86 culminations of Polaris, at each of which were made *eleven* bisections with the *micrometer w* combined with *one* Circle Reading, *six* Nadir observations, and *four* readings for coincidence of Microm give as the probable error of one such observed culmination,

$$(\eta) = \sqrt{(\epsilon\epsilon + \tfrac{1}{6}\eta_2\eta_2 + \tfrac{1}{11}\epsilon_4\epsilon_4 + \tfrac{1}{4}\epsilon_5\epsilon_5 + \epsilon_7\epsilon_7)} = \sqrt{(0''.0174 + \epsilon_7\epsilon_7)} = \pm\, 0''.508.$$

Whence $\epsilon_7 = \pm\, 0''.490$, the *diurnal probable error for observations with the micrometer wire* at 51° *ze distance*; and $\eta_1 = \sqrt{(\epsilon\epsilon + \tfrac{1}{6}\eta_2\eta_2 + \epsilon_4\epsilon_4 + \tfrac{1}{4}\epsilon_5\epsilon_5 + \epsilon_7\epsilon_7)} = \sqrt{(0''.0724 + \epsilon_7\epsilon_7)} = \pm\, 0''.560$, the *probable e of one observed culmination at* 51° *zenith distance*, combining *one* bisection of the star with a *microm wire*, *four* observations for coincidence of micrometer, *one* Circle Reading, and *six* observations for the de mination of the Nadir Point.

This determination of ϵ_7 involves the error of reduction to the *fixed wire*, which so far as any erro the assumed value of one revolution of the micrometer screw is concerned, is very small, as the micrometer terval was in all cases less than one third of a revolution: but the errors of the determined coincidences, wh are not involved in the discrepancies of the component observations, and the changes in the relations of the wires between the determinations of the coincidence and the observations of the star, enter fully.

Both ϵ_6 and ϵ_7 include all changes of the Circle, Microscopes, Telescope or wires, between the dete nation of the Nadir Point and the observation of the star, which may affect the former.

9....The most common observations are those in which are combined *one* bisection of the star with fixed wire, *one* Circle Reading, and *six* observations in the determination of the Nadir Point; and wh probable error (at the zenith distance, 50°) (§ 7) is $\eta = \sqrt{(0''.1027 + \epsilon_6\,\epsilon_6)} = \pm\, 0''.55$. Assigning such an observation a weight, $hh=1$, the weight of an observation in which f bisections with the fixed wire and c Circle Readings, all upon the same set of graduations, are combined with n observations for Nadir Point, will be,

$$hh_f=\frac{\eta\eta}{\varepsilon\varepsilon}=\frac{\varepsilon\varepsilon+\varepsilon_3\varepsilon_3+\frac{1}{6}\eta_2\eta_2+\varepsilon_6\varepsilon_6}{\frac{1}{c}\varepsilon\varepsilon+\frac{1}{f}\varepsilon_3\varepsilon_3+\frac{1}{n}\eta_2\eta_2+\varepsilon_6\varepsilon_6}=\frac{1}{.01\frac{1}{c}+.31\frac{1}{f}+.13\frac{1}{n}+.66},$$

or, with $n=6$,

$$hh_f=\frac{1}{.01\frac{1}{c}+.31\frac{1}{f}+.68}$$

10. The weight of an observation in which are combined m bisections with a micrometer wire, *four* observations for coincidence with the fixed wire, c Circle Readings (the Circle remaining fixed,) and n Nadir observations, will be

$$hh_m=\frac{\eta\eta}{\varepsilon_1\varepsilon_1}=\frac{\varepsilon\varepsilon+\varepsilon_3\varepsilon_3+\frac{1}{6}\eta_2\eta_2+\varepsilon_6\varepsilon_6}{\frac{1}{c}\varepsilon\varepsilon+\frac{1}{m}\varepsilon_4\varepsilon_4+\frac{1}{n}\eta_2\eta_2+\frac{1}{4}\varepsilon_5\varepsilon_5+\varepsilon_7\varepsilon_7}=\frac{1}{.01\frac{1}{c}+.20\frac{1}{m}+.13\frac{1}{n}+.80},$$

or, with $n=6$,

$$hh_m=\frac{1}{.01\frac{1}{c}+.20\frac{1}{m}+.82}$$

11. Where *one* bisection with the fixed wire and m bisections with a micrometer wire have been made, all depending on the same Circle Reading, the same relative weight may be assigned to each.

Then for combining the result of such mixed observation with other observations at the same culmination, assigning to observations with the fixed wire alone the weight, $hh=1$, the relative weights of the mixed or micrometer observations will be

$$hh_{m'}=\frac{\varepsilon\varepsilon+\varepsilon_3\varepsilon_3}{\varepsilon\varepsilon+\frac{1}{m'}\varepsilon_4\varepsilon_4+\frac{1}{4}\varepsilon_5\varepsilon_5+\varepsilon_7\varepsilon_7-\varepsilon_6\varepsilon_6}=\frac{1}{.63\frac{1}{m'}+.45}$$

(m' denoting the whole number of observations which depend upon the same position of the Circle.)

The weight of the mean result of all at the same culmination may be obtained by making in the formulas of § 9, $hh_f=[hh_{m'}]$ of this section.

PRINTED OBSERVATIONS.

The Observations with the Mural Circle occupy pages 44 to 159 of this volume.

Column 1 of *the left hand page* contains the *date* of the observations, the day commencing with the culmination of the Sun.

Column 2 contains the *numbers for reference.* The asterisks indicate the observations, which are referred to in the notes on the right hand margin.

Column 3 contains the names of the *objects observed.* They have been taken from the several catalogues of stars in the following order of preference;

Nautical Almanac;

Catalogue of the British Association;

Weisse's Catalogus Stellarum ex Zonis Regiomontanis;

Bessel's Zones;

Lalande's Catalogue published by the British Association;

Piazzi's Catalogue;

Rumker's Catalogue of 12000 fixed Stars.

Stars not found in any of these are marked "Anonymous." The Right Ascensions and magnitudes (when noted) of those not found in the Catalogue of the British Association, are given in the margin of the right hand page. Stars contained in that Catalogue are designated by the constellation and number, without mention of the Catalogue.

The term "Mic." in this column, indicates that the bisection of the star was made with one of the micrometer wires. When any other wire than *wire* 3 has been used, its number and the reduction to *wire* 3, are given in the margin of the right hand page.

Column 4. The numbers in this column indicate the *vertical wire*, or the position between two vertical wires, at which the object was at the instant of observation.

In cases where a number of observations have been made with the micrometer, and the mean only given, the numbers in this column denote the mean of the several points of observation. An asterisk indicates that the observation was made soon after the star's passage of the wire.

Column 5 contains the *hour angle* at which the object was observed. It is given for the Sun in all cases, and for the Moon and circumpolar stars, whenever the time of making the observation has been noted.

The *hour angle* for the Sun or Moon, is $(\alpha - \tau)\ (1 - \frac{d\alpha}{3610^s})$;
α representing the Right Ascension of the object;
τ, the sidereal time of observation, and
$d\alpha$, the motion in Right Ascension in one hour of mean time.

The Right Ascensions of these bodies have been interpolated from the Nautical Almanac, with the assumed Longitude from Greenwich, $\overset{h.}{5}\ \overset{m.}{8}\ \overset{s.}{14}.64$ West.

Table XIV, *(App. Washington Observations*, 1845, *p.* 76,*)* contains the co-efficients, $1 - \frac{d\alpha}{3610^s}$, for different values of $d\alpha$.

Columns 6 to 12, contain the *Readings* of each of the six *Circle Microscopes*, with their *Mean*. The degrees and minutes are taken from microscope A. alone.

In making these readings, the cross wires of the microscopes have been moved, either to the division nearest to their zero points, (but all in the same direction, either *advance* or *retrograde;*) or to both divisions, on each side of the zero-points; in which case the mean of the two readings only is given, and such *double* readings are designated by the letter *d* in the column of *Means*. In other cases, rejecting from the Circle Reading the largest contained multiple of 5′, if the remainder be less than 2′ 30″, the readings are in *advance;* if greater than 2′ 30″, *retrograde.*

Column 13 contains the readings of the *Telescope Micrometer*, when the observations were made with one of the *micrometer* wires.

In many cases, several bisections of a star have been made at the same culmination, the several micrometer readings reduced to the meridian, and the mean only given in this column. Such cases with the number of observations are noted in the margin of the right hand page.

The reduction to the meridian is expressed by the formula,

$$dm = -\,0\overset{r}{.}00206 \tan\delta\,(IV - v)^2;$$

in which *v* denotes the *vertical wire*, or the position between two vertical wires, at which the observation was made. The sign of this reduction is changed for *direct* observations *below* the pole, and for observations by *reflection* of stars *above* the pole.

Columns 14 and 15, contain the readings of the *Barometer*, (which is one of Newman's,) and of its *Attached Thermometer.*

Column 16 contains the readings of the *External Thermometer*, which is placed on the North side of the observing room, outside. The Thermometer used until October 28, was that which is designated as "No. 0;" and the one substituted on that date, that designated as "No. 2," in the Appendix of the Washington Observations for 1845, pp. (45-56;) from which the following corrections of their scales are quoted.

TABLE I.

Reductions of Scale reading to Normal Temperature.

Therm. Scale.	No. 0.	No. 2.	Therm. Scale.	No. 0.	No. 2.
°	°	°	°	°	°
5		—0.21	62	—0.35	+0.10
10		.22	64	.36	.09
15		.17	66	.26	.09
20		.11	68	.20	.10
25		.06	70	.19	.12
30	+0.46	— .02	72	.16	.11
32	.46	.00	74	.12	.10
34	.46	+ .02	76	.12	.09
36	.45	.04	78	.17	.08
38	.44	.06	80	.26	.06
40	.40	.08	82	.30	.05
42	.36	.09	84	.29	.03
44	.37	.10	86	.24	+ .02
46	.34	.11	88	.15	— .01
48	.23	.12	90	.03	.03
50	+ .10	.13	92	.00	.03
52	.00	.12	94	.04	.04
54	— .13	.11	96	.08	.04
56	.26	.11	98	.10	.05
58	.30	.10	100	—0.10	—0.06
60	—0.32	+0.10			

Columns 17, 18 and 19, contain the readings of the several *Thermometers* attached to the instrument, viz: one inside of the *Stone* pier, and two upon the face of the pier, the one a few inches *above*, the other a few inches *below* the limb of the Circle.

The *margin of the left hand page* contains:

1. The *micrometer coincidence* determined in the manner described on page xxiii, with the day and siderial hour at which each determination was made.

2. The *value of one revolution* of the micrometer screw, which has been employed in reducing the observations; derived from the determinations given in Table F, (pp. xix to xxii.)

3. The *semi-diameters* of the Sun, Moon and planets, obtained from the observations, corrected for refraction, parallax and defective illumination.

4. The *error of runs* with the corresponding temperatures of the circle and pier, from the determination of the same day, as recorded in Table B, (pages xiv to xvii,) when six observations have been made; otherwise from the determination for the period, Table C, (page xvii.)

5. Notes relating to the adjustment and condition of the instument.

Column 1 of the *right hand page*, contains the *numbers for reference*, and is a repetition of Col. 2, of the left hand page.

Column 2 contains under the heading of *Corrections for Instrument*, the reductions, to be applied to the readings of the Circle, which depend upon the condition or defective adjustment of the Circle and Microscopes; and also all those which are requisite for reducing an observation, made at any point in the field of view of the telescope, to the normal point of that field, viz: the intersection of the fixed horizontal wire with the meridian, or, nearly, with the *vertical wire IV.*

These embrace,

1. The correction for the *errors of graduation*, when the Circle Reading is nearly 0° or 60°. These, in the few cases, where they have been applied, (except for α Lyræ,) are noted in the margin. They differ slightly from those given in Table A, (page xii,) having been derived from the discussion of fewer observations. The difference has been applied in making up the table of mean places.

2. The correction for *runs*, represented by

$r = -\,\mathrm{C}\,\frac{\mathrm{R}}{5'}$ for an *advance* reading;

$r = (5' - \mathrm{C})\,\frac{\mathrm{R}}{5'}$ for a *retrograde* reading;

$r = (2'\tfrac{1}{2} - \mathrm{C})\,\frac{\mathrm{R}}{5'}$ for a *double* reading;

$$\mathrm{R} = \mathrm{R}' + 0''.061\left(\frac{t+t'}{2} - t_0\right) - 0''.014\,(t - t') - 0''.036\,(\tau - \tau_0);$$

where C is the Circle Reading from Col. 6 and 12, expressed in minutes, and omitting the largest contained multiple of 5′; R′, the error of runs, and t_0 and τ_0 the temperatures of the Circle and Stone respectively, from the margin of the left hand page; and τ, t and t' the readings respectively of the Stone, Upper and Lower Thermometers, in Col. 17, 18 and 19 of the left hand page.

3. The correction for *difference of runs* or the inclination of the microscopes, viz:

$dr = -\,\mathrm{C}^2\,\frac{d\mathrm{R}}{50'}$ for an *advance* reading;

Æ being taken from Table D, (page xviii.) This correction, though minute, is yet constant or nearly so, for all observations of the same star.

4. The correction for *the inclination of the wire*, with which the observation has been made, expressed by

$$i = (IV - v)\ \frac{dc^{\mathrm{I}}}{3} \quad \text{for an observation with the } \textit{fixed} \text{ wire;}$$

$$i = (IV - v)\ \frac{dc^{\mathrm{I}}_{3}}{3} \quad \text{for an observation with } \textit{micrometer wire } 3\text{;}$$

where v represents the position of the object at the instant of observation at or between the vertical wires, as in column 13, (left hand page;) and dc^{I} and dc^{I}_{3}, the reductions for observations made at the *vertical wire I*, as given in Table G, (page xxiii,). Observations with the other *micrometer* wires are first reduced to *wire* 3, by applying the reductions given in Table H, (page xxiv,) or in the right hand margin. This correction has not usually been applied, where the observations are symmetrical with reference to *vertical wire IV.*

5. The *reduction to the meridian*, (if not already applied to the Mic. Readings, in col. 13, of the left hand page,) obtained from the expression,[*] $\mu = \text{cosec } 1'' \sin^2 \tfrac{1}{2} h \sin 2\delta$

where h, is the *hour angle*, in col. 5, of the left hand page: or from the expression,

$$\mu = 0''.1292 \tan \delta\ (IV - v)^2$$

where v denotes as before (pp. xxix and xxxi) the position of the object with reference to the vertical wires.

This reduction is applied with the *opposite* sign to observations by *reflection* of stars *above* the pole, and to *direct* observations of stars *below* the pole.

6. The *reduction*, in observations of the Sun and Moon, due to their *change of declination* in the sidereal interval, h', from the meridian, (vide col. 5, of the left hand page;) obtained from the expressions,[†]

$$\mu' = \frac{h'}{600^{s}}\ d\delta' \qquad \text{for the Sun;}$$

$$\mu' = \frac{h'}{100^{s}}\ d\delta' \qquad \text{for the Moon:} \qquad \text{in which } h' = \alpha - \tau\text{, is expressed in seconds of time, and}$$

$$d\delta' = \frac{d\delta}{6.016},$$

$d\delta$, being the change of declination for the Sun, in *one hour*, or for the Moon in *ten minutes* of mean time.

7. The *reduction* to the *fixed wire* for an observation made with a *micrometer wire*, or

$$dC = (m_0 - m)\, r,$$

m_0, denoting the *mic. coin.*, and r, the *mic. value*, in the margin of the left hand page; and m, the micrometer reading in col. 13, of the left hand page, corrected by means of Table E, (page xviii;) and in the case of observations with other micrometer wires, reduced to *wire* 3, by the quantities noted in the margin, or contained in Table H, (page xxiv.)

Column 3 contains, under the heading of *Corrections for Objects:*

1. The reduction for *atmospheric refraction*, computed from Bessel's Tables, for the observed Zenith Distance and the readings of the Barometer, the Attached and the External Thermometers, (the latter corrected

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[*] Tables XIII, XVI to XIX, App. Wash. Obs. 1845, pp. 76 to 79.

[†] Table XV, " " " " p. 76.

by the quantities in Table I, page xxix), given in columns 14, 15, 16, of the left hand page. An expansion of these tables is given in the Wash. Obs. for 1845, App. pp. 58-71.

Z, representing the Zenith Point in column 5;

C′, the Circle Readings, corrected by the quantities in the preceding column, except (5) and (6;)

the observed Zenith Distance, $z = \mathrm{C}' - \mathrm{Z}$ for a *direct* observation,

$z = 180^\circ - (\mathrm{C}' - \mathrm{Z},)$ for an observation by *reflection*.

The correction for refraction, as applied to the Circle Readings, is affected with the sign appropriate to $\tan(\mathrm{C}' - \mathrm{Z}.)$

2. The reduction for *parallax*, in observations of the Sun, Moon and Planets, obtained from the formulas;

for the Sun and Planets, $\log p$ (in seconds) $= 0.93280 + \log \text{sine}\,(z' - 11'\,14''.54) - \log d$;

for the Moon, $\log \text{sine}\, p' = \log \text{sine}\, \pi + \log \text{sine}\,(z' - 11'\,14''.54) + 9.9994302$,

or $\log p'$ (in seconds) $= \log \pi$ (in seconds) $+ \log \text{sine}\,(z' - 11'\,14''.54) + 9.9994302$

$+ \log \frac{\text{sine}}{\text{arc}}\,(\text{for } \pi) + \log \frac{\text{arc}}{\text{sine}}\,(\text{for } p')$[*]

$p = p' \mp \frac{1}{4}\,(p' \mp s)\,\text{sine}\, p'\,\text{sine}\, s,$[†]

the *upper* signs being adapted to an observation of the *upper* Limb, the *lower* signs to an observation of the *lower* Limb. In which formulas,

z' represents the observed Zenith Distance, corrected for refraction;

d, the *distance* of the Sun or Planet from the Earth;

π, the *equatorial horizontal parallax* of the Moon, which for these observations has been interpolated from the Nautical Almanac, with second differences.

s, the Moon's *Semi-diameter;*

and p, the required *reduction for parallax*, which, as applied to the Circle Reading, is affected with the sign —.

And further, assuming from Bessel's most recent determination for the terrestrial spheroid, $\frac{1}{\mathrm{P}} = .003343$,

and from Encke, the *mean horizontal parallax* of the Sun, $\mathrm{P} = 8''.5776$;

the *reduction for the Latitude*, 38° 53′ 39″.25, is $-11'\,14''.54$,

$\log \rho = \log \frac{\mathrm{R}}{\mathrm{A}} = 9.9994302$, and

$\log \rho\, \mathrm{P} = 0.93280$.

The reductions for refraction and parallax have been computed for the observed limbs of the Sun or Moon, or for each limb separately, when both have been observed.

3. A reduction on account of *defective illumination*, applied in some cases to observations of one of the limbs of the Moon, Venus, or Mercury. Such cases, together with the corrections applied, are noted in the margin.

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[*] Tables IX & X, App. Wash. Obs. 1845, p. 74.

[†] Table XI, " " " p. 74.

Let a represent the difference of the Right Ascensions of the Moon or Planet, and Sun,

δ_s, the declination of the Sun,

δ_m, the declination of the Moon or Planet,

s, the apparent semi-diameter of the Moon or Planet, and

ϑ, the angle of position of the line joining the cusps;

then $$\tan \vartheta = \operatorname{cosec} a \cos \delta_m \tan \delta_s - \cot a \sin \delta_m,$$

a *negative* value of which indicates a defective illumination of the *North* limb;

and, ϑ being taken numerically less than 90°, the correction for an observation of a *cusp* becomes

$$ds = s \operatorname{versine} \vartheta,$$

to be applied to the observation of the defective limb, so as to augment the measured diameter.

For Mercury, ϑ may readily be obtained from a celestial globe, by bringing the geocentric place of the planet to the zenith point of the globe, and passing the quadrant of altitude through the Sun's place; ϑ is then the arc on the horizon intercepted between the quadrant of altitude and the East or West points; the *northern* or *southern* position of this arc indicating, respectively, a full illumination of the *North* or *South* limbs.

If we take i to represent the angular distance of the Sun and Earth, as viewed from the Moon or Planet, and make $$\sin \vartheta' = \sin \vartheta \sin i,$$

the correction for an observation made on the *gibbous* portion of the disk becomes

$$ds = s \operatorname{versin} \vartheta'$$

For Mercury and Venus, ϑ' may be obtained more conveniently from a celestial globe, by bringing the planet's geocentric place to the South point of the horizon, and measuring the altitude or depression of its heliocentric place; an *elevation* indicating a defective illumination of the *North* limb; a *depression*, a defective illumination of the *South* limb. The proximity of the Moon to the Earth affords for that body a more convenient method of determining ϑ', by the substitution of geocentric for heliocentric places.

$$\text{Making} \quad \tan \delta' = \tan \delta_m \cos a;$$
$$\sin \vartheta' = \sin(\delta_s - \delta') \cos \delta_m \sec \delta',$$

a *negative* value of which indicates a defective illumination of the *North* limb.

4. The reduction for *semi-diameter*, when only one limb of the Sun, Moon, or a Planet has been observed, obtained from the expressions,

$$\log s = 2.9826782 - \log d \qquad \text{for the Sun;}$$
$$\left.\begin{array}{ll} & \log \sin s = 9.4353665 + \log \sin \pi \\ \text{or} & \log s = 9.4353665 + \log \pi + \log \frac{\sin}{\text{arc}}\,(\text{for } \pi) + \log \frac{\text{arc}}{\sin}\,(\text{for } s)^{*} \end{array}\right\} \text{for the Moon;}$$

and from the Nautical Almanac, for the Planets, in the very few cases, in which it has been required.

Column 4 contains the *Corrected Readings*, obtained by applying the reductions in columns 2 and 3 to the *Mean* of the Circle Readings in col. 12 of the left hand page.

[*] Table IX, X, Wash. Obs. 1845, App. p. 74.

For the Sun, Moon, and Planets, when both limbs have been observed, the mean of the two readings is given, so that the quantities in this column are the corrected readings for the centers. In such cases, half the differences of the two corrected readings constitute the *observed semi-diameters* in the margin of the left hand page.

Column 5 contains the *Zenith Points*, derived from the observed *Nadir Points*, given in the last columns of this page.

Column 6 contains the *Apparent Declinations*, derived from the observations. Representing by C'', the *Corrected Reading* in col. 4; by Z, the Zenith Point in col. 5; and assuming the Latitude of the Observatory to be 38°53′39″.25 North; the *Apparent Declination*,

$$\begin{array}{lrrrll}
 & ^\circ & ' & '' & & \\
\delta = & 38 & 53 & 39.25 & -\,(C''-Z), & \text{for an observation } \textit{direct, above} \text{ the pole,} \\
\delta = & -\,218 & 53 & 39.25 & +\,(C''-Z), & \text{`` \quad ``} \quad \textit{direct, below} \text{ the pole,} \\
\delta = & -\,141 & 6 & 20.75 & +\,(C''-Z), & \text{`` \quad ``} \quad \textit{by reflection, above} \text{ the pole,} \\
\delta = & 321 & 6 & 20.75 & -\,(C''-Z), & \text{`` \quad ``} \quad \textit{by reflection, below} \text{ the pole;}
\end{array}$$

in which expressions C'' may always be made greater than Z, by adding 360°.

The Declinations in this column for the Sun, Moon, and Planets are the Declinations of the centers of those objects. Those of Polaris are the mean results of all the observations at the same culmination, combined by means of the formulas in § 11, page xxvii.

Column 7 contains for the fixed stars, the reductions to the mean equinox and ecliptic at the commencement of the year 1850, or at that moment of time when the Sun's Mean Longitude will be 281°.* They have been computed by means of Bessel's formulas, with the co-efficients for Aberration, Nutation and Precession in the Introduction to the Catalogue of the British Association.

The proper motions of the Nautical Almanac stars, from the Catalogue in the Almanac for 1848, and of 1164 B. A. C. and 61^2 Cygni from the Catalogue of the British Association, are included: those of α^1 Geminorum and 4345 B. A. C. have been assumed the same as for their companions.

For Polaris, δ and λ Ursæ Minoris, γ Cephei, and α Lyræ, the reductions include the terms depending on 2☾, also the other minor terms, given in the formulas in Peter's "Constans Nutationis."

Column 8 contains the initials of the names of the Observers, Lieut. Page and Prof. Coffin. The latter has been charged with the duty of revising the observations. In computing the reductions to 1850, and preparing the work with this instrument for the press, he has been assisted at different times by Passed Mid. Shields, Caldwell, Ransom and Bissel.

The remaining columns contain the determinations of the Nadir Points, according to the method described on page xi. In general, each reading indicates a separate and distinct determination, involving a new coincidence of the wire with its reflected image and a new reading of the Circle. The *day* and *sidereal hour* of each determination are also given together with the Observer's initial. The *correction*

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*1850, January 1. 0*h*. 13*m*. mean time, Washington.

given at the end of each determination includes the correction for *runs*, and — 0″.135 for the *accidental error of graduation*. The correction given for 180°0′ in Table A, (page xii), viz. —0″.187, has been derived from the discussion of a more extended series of observations, and is more to be relied on.

The margin contains the readings of the Stone, Upper and Lower Thermometers at each determination of the Nadir Point; notes, relating to particular observations, designated by the reference numbers; and also to the determinations of the Nadir Point, among which are given half the estimated distances of *vertical wire IV* from its reflected image, under the designation of apparent error of collimation.

MEAN DECLINATIONS, 1850.0.

Pages 372 to 377, contain the *Mean Declinations* for 1850.0 of the several stars, as determined from the observations with this instrument. They have been obtained by applying to the *Apparent Declinations* in col. 6 of the right hand page of the printed observations (pp. 44 to 159), the *Reductions to* 1850.0 in col. 7, and ∓0″.05, as a further correction required for the Nadir Points on account of errors of graduation; the upper sign being adapted to observations *direct above* the pole, or by *reflection below* the pole.

The brackets indicate the observations which, in general for reasons stated in the notes to the printed observations, are regarded as deserving rejection.

The weights, *hh*, assigned to the several observations of Polaris, are obtained from the formulas in §§ 9 to 11 (page xxvii).

The corrections from Tables A and A′ (pages xii and xiii), which have been applied for errors of division, are also given.

On pages 428 to 441 are given for each star the mean results of these Declinations and the probable error of each determination. These probable errors do not include the probable error of graduation, viz: $\epsilon_1 = \pm 0''.07$, (page xxv.)

APPARENT DECLINATIONS AND VERTICAL SEMI-DIAMETERS OF THE SUN, MOON, AND PLANETS.

Pages 408 to 413, contain the *Apparent Declinations* of the centers of the Sun and Planets, transferred (first applying the correction —0″.05) from col. 6 of the right hand page of the printed observations, (omitting those regarded as deserving rejection:) also the *Apparent Declinations* of the center of the Moon, carried out for each limb separately, when both have been observed. These are accompanied by the *Washington Mean Times of Observation*, computed from the sidereal times to which the observations have been reduced (col. 5, p. xxviii, and § 6, p. xxxi;)

The *limb observed*, when only one;

The *seconds* of Declination interpolated from the Nautical Almanac, with the Long. $\overset{h.}{5}\ \overset{m.}{8}\ \overset{s.}{14}.64$; except those for Neptune, which have been taken from Mr. S. C. Walker's Ephemeris, published by the Smithsonian Institution;

The differences of the *computed* from the *observed* Declinations, or " C — O;"

The reductions for *defective illumination* which have been applied to some of the observations of the Moon.

There are also given:

The *observed vertical semi-diameters,* transferred from the margin of the left hand page of the print observations;

The *Computed semi-diameters,* for the Planets taken from the Nautical Almanac; for the Sun and Mo computed by means of the formulas, (page xxxiii;)

The difference of the *computed* from the *observed* semi-diameters, or "C — O."

From these last we have for the excess of the *measured* over the *tabulated* semi-diameters;

	″		
Of the Sun,	2.11	from 87 observations.	
Moon,	4.09	11	
Mercury,	0.80	5	
Venus,	1.17	13	Jan. 8 to April 26.
	0.80	17	July 12 to Oct. 9.
Mars,	1.13	6	
Jupiter,	0.98	16	
Saturn,	0.87	17	

In observing these bodies, it is easier to bring the edge than the middle of the wire into contact with tl limb. A part of this excess is doubtless due to this mode of observing, and hence a deduction of $0''.8$, tl semi-diameter of a wire, may be allowed. These quantities are approximately the corrections which should l applied to the Declinations of the several objects, which have been obtained from observations of one lin only; with the sign — for observations of the North, and the sign + for those of the South, limb.

THE MERIDIAN CIRCLE.

The Meridian Circle is represented in Plates VII and VIII, Vol. I. The foundation upon which it rests is of masonry, and similar to those of the West Transit and Mural. The piers are of granite. At each end of the axis, and outside of each pier, is a circle 30 in. in diameter; of which one, the Western during the year 1846, is graduated only to fifteen minutes, and subdivided by a vernier to single minutes. This is the finding circle. To it is attached the clamp, the binding screw of which passes through the pier; the tangent screw, for slow motion in declination, acting on the clamp carries with it the circle and telescope. This circle may be rotated upon the axis, and is adjusted so that the zero of graduations corresponds to the zenith. The reading for the Equator is, when the finding circle is West, 321° 6′; when East, 38° 54′. The second circle is graduated to three minutes, and subdivided by four microscopes, lettered A, B, C, D, which read to single seconds, and, by estimation, to tenths of seconds. This circle is left entirely free from clamps, &c., and is never touched by the observer at any time. The microscopes are held by four bearers resting on the circumference of a smaller circle, which is supported by a prolongation of the axis of the instrument, but prevented from turning with it by means of a small bar proceeding downwards from the centre; this bar being confined between the two screws which, when the Telescope is reversed, give the slow motion to the instrument. A spirit-level attached to the bar and small circle, and called the alidade-level, is intended to detect any rotation of the microscope system about the common centre. This level, however, cannot be reversed, and experience has shown that its indications could not be trusted—as the presence of the observer's person, while reading the microscopes, affected it sensibly. And whenever a current of air passed through the room it caused such changes of position in the bubble as to render unsafe any inference of change in the instrument; and the readings have been therefore entirely disregarded. One division of this level is equal to 2″.78. A similar level is attached to the other extremity of the axis near the finding circle, but no use has been made of it.

From the top of each pier rises a small brass pillar to the height of 21.5 inches, through which passes a steel lever 15.5 inches long, parallel with the horizontal axis, and intended to remove by a counterpoise, the additional weight of the alidade circle and microscopes from the axis of the instrument. From the side of one of these pillars also projects a small hook which serves to support the striding level when in position. The pillars fit in sockets at their base, instead of being permanent, as it is necessary to remove them before reversing the instrument. The main counterpoises, bearing on the axis, are applied through friction rollers and by means of short horizontal levers at points immediately adjoining and within the termination of the steel pivots.

The Telescope tube is 56 inches in length; being composed of the central cube and two brass cones, each 24 inches long and 7.2 in. diameter at the cube, and 3.8 in. at the end. The broad rings containing the object-glass and eye-tube, fit accurately the extremities of the main tube, surface to surface, and are convertible;

the change from object-end to eye-end being very easily effected, and the simplest means thus afforded for eliminating the effect of flexure. The object-glass has 4.5 inches of clear aperture, and 58.2 inches focal length. The optical performance of the Telescope is most excellent, enabling the observer to employ the highest magnifying power with advantage in the ordinary state of the atmosphere. The lower powers have generally been used only for observations of the sun and of faint stars, which would bear but feeble illumination.

The diaphragm of the eye-piece originally contained seven fixed and one movable vertical, and two close horizontal wires. To adapt it for the purpose of cataloguing, in April, 1846, four new transit wires were introduced, two on each side of the seven, and separated from them by a larger interval than those in the system. The micrometer-plate also was turned 90°, and a set of seven wires inserted in it at given intervals convenient for distinguishing the wires during rapid observation. A contrivance was added which gives the eye-piece a vertical as well as horizontal motion, enabling it to command the whole field of view afforded by the object-glass. These arrangements were similar to those described in Vol. I, for the West Transit and Mural.

The illumination of the field of view is effected by means of a small lamp attached to a bent arm which enters the piers immediately below the finding circle, and the light is conveniently modified by a small piece of red glass fitted to the open end of the axis.

The reversing apparatus, as may be seen from Plate VIII, Vol. I, was attached to the piers by two cross pieces which supported and steadied the screw. A slight experience, in 1845, was sufficient to show that this mode of reversing was too prejudicial to the permanence of adjustment to be continued with safety, and there being no other means at hand of effecting the reversal, the instrument was suffered to remain in one position during the year 1846. A new arrangement has been since adopted, which, it is hoped, will prove more successful.

The value of one division of the tube of the striding level, as determined by means of the Mural Circle, is $1''.681 = 0^s.1121$. To obtain, therefore, the correction, expressed in time, for the inclination of the axis to the horizon, it is necessary, after taking n readings of each end of the bubble in both positions of the level, and taking the sums of the east and west readings separately, to multiply the $\Sigma W - \Sigma E$ by $\frac{0^s.1121}{4n}$. Most commonly $n = 3$, and in this case the multiplier is $.^s00934$. The result is to be introduced with the proper sign into the formula for obtaining the corrections of the instrument.

The following level-readings were taken in 1845 by Lieut. Maury, for the purpose of determining the inequality of the pivots:

Date.	ALIDADE EAST.		ALIDADE WEST.		Excess of Alidade pivot.
	Zen. Dist.	E. end high.	Zen. Dist.	E. end high.	
		div.		*div.*	*div.*
Dec. 3	36° N.	2.39	36° S.	1.35	0.52
	50	2.43	50	1.34	.54
	130	2.50	130	1.37	.56
	141	2.45	141	1.35	.55
	141 S.	1.42	141 N.	1.22	.10

Date.	ALIDADE EAST.		ALIDADE WEST.		Excess of Alidade pivot.
	Zen. Dist.	E. end high.	Zen. Dist.	E. end high.	
		div.		*div.*	*div.*
Dec. 3	130° S.	1.44	130° N.	1.09	0.18
	50	1.38	50	1.22	.08
	36	1.41	36	1.14	.14
Dec. 9	36 N.	1.64	36 S.	1.53	.06
	54	1.62	54	1.58	.02
	126	2.46	126	1.65	.40
	144	2.59	144	1.65	.47
	144 S.	2.25	144 N.	1.81	.22
	126	2.28	126	1.58	.35
	54	2.26	54	2.14	.06
	36	2.28	36	1.84	.22

The mean of these determinations gives for the excess of the alidade pivot $\overset{div.}{0.28}=\overset{s.}{.031}$. Separating the values for zenith distances less than 90° from the others, we have for the former $\overset{div.}{0.20}=\overset{s.}{.023}$, and for the latter $\overset{div.}{0.35}=\overset{s.}{.040}$. This indicates a defect of figure of one or both the pivots. The correction for inequality to be applied to the constant of inclination determined by the spirit-level, is $\pm\overset{div.}{0.14}=\pm\overset{s.}{.015}$: the upper sign obtaining when the Alidade is East.

To determine the error of figure of the pivots, the following readings of the striding level were taken by Prof. Hubbard.

CIRCLE.	ΣW−ΣE.		Diff. from Mean.		Mean Errors.
1847.	Jan. 26.	Feb. 8.			
°	*div.*	*div.*	*div.*	*div.*	*div.*
140	− 56.1	− 36.8	+ 2.0	− 0.2	+ 0.90
135	57.0	39.3	1.0	2.3	− 0.65
130	54.0	36.9	4.1	0.3	+ 1.90
125	56.7	38.6	1.4	2.0	− 0.30
120	56.5	37.7	1.6	− 1.1	+ 0.25
115	58.0	36.6	0.1	0.0	0.05
110	55.8	36.0	2.3	+ 0.6	1.45
105	55.9	38.2	2.2	− 1.6	0.30
100	54.4	38.7	+ 3.7	2.1	+ 0.80
95	59.6	39.9	− 1.5	− 3.3	− 2.40
90	62.3	36.0	4.2	+ 0.6	1.80
85	60.3	38.1	2.2	− 1.5	1.85
80	62.7	39.9	4.6	3.3	3.95
75	60.3	39.9	2.2	3.3	2.75
70	63.9	38.7	5.8	− 2.1	3.95
65	59.1	36.3	1.0	+ 0.3	0.35
60	59.1	36.6	1.0	0.0	− 0.50

CIRCLE.	ΣW−ΣE.		Diff. from Mean.		Mean Errors.
1847	Jan. 26.	Feb. 8.			
°	*div.*	*div.*	*div.*	*div.*	*div.*
55	— 58.1	— 36.9	0.0	— 0.3	— 0.15
50	58.2	37.5	— 0.1	— 0.9	— 0.50
45	54.9	36.0	+ 3.2	+ 0.6	+ 1.90
40	58.6	36.1	— 0.5	+ 0.5	0.00
320	56.0	32.1	+ 2.1	+ 4.5	+ 3.30
315	55.5	35.4	2.6	1.2	1.90
310	54.9	35.4	3.2	1.2	2.20
305	52.5	33.8	5.6	2.8	4.20
300	56.1	35.1	2.0	1.5	1.75
295	52.8	35.2	5.3	1.4	3.35
290	55.5	34.8	2.6	1.6	2.10
285	55.8	32.7	+ 2.3	3.9	+ 3.10
280	60.6	35.4	— 2.5	1.2	— 0.65
275	56.9	35.4	+ 1.2	1.2	+ 1.20
270	55.6	35.7	+ 2.5	0.9	1.70
265	59.8	33.6	— 1.7	3.0	0.65
260	58.5	35.4	0.4	+ 1.2	+ 0.40
255	59.7	37.2	1.6	— 0.6	— 1.10
250	60.9	35.4	2.8	+ 1.2	0.80
245	61.4	37.8	3.3	— 1.2	2.25
240	61.2	37.5	3.1	0.9	2.00
235	62.1	37.8	4.0	1.2	2.60
230	61.5	37.2	3.4	0.6	2.00
225	61.5	38.7	3.4	2.1	2.75
220	60.5	38.3	— 2.4	— 1.7	— 2.05

The ΣW and ΣE in the heading of the second and third columns of the above table, indicate the sums of 6 readings of the levels, three in each position: the quantities exhibited in these columns are therefore 12 times the error of level expressed in divisions of the level tube, and the quantities in the sixth column show 12 times the error of form of the pivots as deduced from the two sets of observations, also expressed in divisions of the level tube. The progression of signs indicates tolerably well the existence of such an error, but its amount is small and uncertain, and a slight calculation shows that its effect upon an observed transit is entirely inappreciable. It may be remarked moreover, that a possible elliptical figure of the pivots would escape detection in readings of this kind. The most direct method of determining this error, or more properly its effect upon observations of Right Ascension, would be to compare together the instrumental deviations furnished by different circumpolar stars. This has not yet been done to the necessary extent, but more perfect modes of observing will soon furnish, it is hoped, an accurate knowledge of the error in question. The evidence furnished by the circle readings will be considered below.

The subdivision of the graduated circle is effected, as has been already stated, by means of four microscopes. In the focus of the eye-piece of each microscope, are two parallel wires, about 10″ apart, which, when the circle is to be read, are placed so as to include between them the broad division-marks of the limb; a mode of reading inferior in accuracy to that with cross-wires as in Troughton's microscopes. To determine any appreciable error of the screws or micrometer-head, the latter being placed nearly at zero, a division-mark of the circle was brought exactly under one of these wires: the reading of the head being noted, the screw was turned until the other wire bisected the mark, and the reading noted again. Then by moving the circle or alidade, the mark was again brought under the first wire, and the operation repeated through a whole revolution of the screw, and again through the same revolution in the opposite direction. This was done with each microscope, and the results are as follows, each reading being the mean of three observations:

MEASURED INTERVALS.					DIFFERENCES FROM MEAN.			
	A.	B.	C.	D.	A.	B.	C.	D.
″ ″	″	″	″	″	″	″	″	″
0 to 10	10.2	10.7	9.2	10.7	— .52	+ .28	— .38	— .13
10 " 20	10.9	10.2	8.6	10.7	+ .18	— .22	.98	.13
20 " 30	10.3	10.5	9.2	10.4	— .42	+ .08	.38	— .43
30 " 40	10.8	10.3	9.2	10.9	+ .08	— .12	— .38	+ .07
40 " 50	11.0	10.4	10.2	11.4	+ .28	.02	+ .62	+ .57
50 " 60	10.6	10.4	10.8	10.8	— .12	— .02	+ 1.22	— .03
60 " 50	10.8	11.1	10.0	10.9	+ .08	+ .68	+ .42	+ .07
50 " 40	10.8	11.0	9.9	11.4	.08	.58	+ .32	.57
40 " 30	11.0	10.6	9.2	11.1	.28	+ .18	— .38	+ .27
30 " 20	11.0	9.6	9.2	10.4	.28	— .82	.38	— .43
20 " 10	10.8	10.1	9.3	10.4	+ .08	.32	— .28	— .43
10 " 0	10.4	10.2	10.2	10.9	— .32	— .22	+ .62	+ .07

To test the equality of each screw, in different parts of its length, Professor Major measured the interval between two consecutive divisions of the limb, commencing with the micrometer head at zero, and advancing it by 10″ at each successive measurement. The following table shows the excess over 3′ of the intervals thus measured:

					DIFFERENCES FROM MEAN.			
	A.	B.	C.	D.	A.	B.	C.	D.
° ′ ″	″	″	″	″	″	″	″	″
179 57 0	— 2.8	— 0.2	+ 1.1	— 2.9	— .08	— .85	— .29	— .67
10	2.5	+ 0.8	1.8	2.3	+ .22	+ .15	+ .41	— .07
20	2.8	+ 0.6	1.7	2.2	— .08	— .05	.31	+ .03
30	2.4	0.0	2.0	2.4	+ .32	.65	.61	— .17
40	2.1	— 0.1	2.1	2.3	.62	.75	+ .71	— .07
50	2.6	+ 0.4	0.9	2.2	.12	.25	— .49	+ .03
58 0	2.5	0.6	1.2	2.5	+ .22	— .05	.19	— .27
10	2.9	0.7	0.7	2.6	— .18	+ .05	— .69	— .37
20	2.8	0.2	1.5	2.2	— .08	— .45	+ .11	+ .03
30	— 2.2	+ 1.0	+ 1.5	— 2.2	+ .52	+ .35	+ .11	+ .03

					DIFFERENCES FROM MEAN.			
	A.	B.	C.	D.	A.	B.	C.	D.
° ′ ″	″	″	″	″	″	″	″	″
179 58 40	— 2.8	+ 1.3	+ 1.8	— 2.0	— .08	+ .65	+ .41	+ .23
50	2.2	0.7	1.5	2.2	+ .52	.05	.11	.03
59 0	2.8	1.5	1.7	1.5	— .08	.85	+ .31	.73
10	2.8	0.7	0.2	1.8	.08	.05	— 1.19	.43
20	3.0	0.9	1.2	2.0	— .28	.25	.19	.23
30	2.7	1.3	1.0	1.8	+ .02	+ .65	.39	.43
40	3.0	0.5	1.3	2.1	— .28	— .15	— .09	+ .13
50	3.2	0.5	1.4	2.5	.48	— .15	+ .01	— .27
180 0 0	— 3.5	+ 1.0	+ 1.8	— 2.6	— .78	+ .35	+ .41	— .37

Another set of observations similarly treated gave:

					DIFFERENCES FROM MEAN.			
	A.	B.	C.	D.	A.	B.	C.	D.
° ′ ″	″	″	″	″	″	″	″	″
179 57 0	— 1.3	+ 0.2	+ 0.5	— 1.1	— .27	+ .35	— .09	+ .13
11	1.4	0.1	1.2	0.9	— .37	.25	+ .61	+ .33
22	1.0	+ 0.1	1.1	1.6	+ .03	.25	.51	— .37
33	1.1	— 0.1	0.6	1.3	— .07	.05	.01	.07
44	1.1	0.1	0.8	1.3	.07	+ .05	+ .21	.07
55	1.2	0.4	0.1	1.5	.17	— .25	— .49	.27
58 6	1.1	0.5	0.5	1.8	— .07	.35	— .09	— .47
17	0.9	0.3	0.6	1.1	+ .13	.15	+ .01	+ .13
28	0.7	0.3	0.6	1.0	.43	— .15	.01	.23
39	1.0	0.1	1.0	1.0	.03	+ .05	+ .41	.23
50	0.9	0.3	0.3	1.0	.13	— .15	— .29	.23
59 1	1.0	0.3	0.2	1.0	.03	— .15	.39	+ .23
12	0.9	— 0.1	0.2	1.6	.13	+ .05	.39	— .37
23	0.9	+ 0.1	0.4	1.4	.13	.25	— .19	.17
34	1.0	— 0.1	0.6	1.3	.03	+ .05	+ .01	— .07
45	0.9	0.2	0.7	1.0	+ .13	— .05	.11	+ .23
179 59 56	— 1.1	— 0.2	+ 0.6	— 1.0	— .07	— .05	+ .01	+ .23

The evidence of a law of error is too unsatisfactory to be made available, and though the existence of such a law is by no means improbable, its detection is presumed to be beyond the power of the microscopes. Assuming all the readings to have equal weight, the probable error of a single measured interval is = ± 0.″22, and the probable error of a single reading = ± 0.″32.

The discrepancies in the observed runs excited attention immediately upon commencing to use the instrument in 1845, and were found to arise chiefly from accidental errors of division. These were seen to be so great as almost to preclude the hope of obtaining a satisfactory determination of any law of error, either of runs or of division. An attempt was made however, by a comparison of readings taken at intervals of 5°, to ascertain if such laws existed, and to determine, if possible, the constants. Independently of accidental errors of division, and of reading off, the error of runs is variable through a change of distance of the microscope from the circle, caused either by a want of perpendicularity of the circle to the axis, or by a deviation from the axis of the prolongation which supports the alidade. The former will produce no change in the alidade level; the latter will cause a motion of the bubble, and the expression of this motion will have the form $a \sin (u + \mathcal{A})$ The amount of motion will, however, be insignificant when compared with the change produced in the runs.

The following readings were taken in 1847. Each determination is a mean of two, as the space on each side of the division mark was measured.

I. JAN. 2, 1847.

	OBSERVED RUNS.				DIFFERENCES FROM THE MEAN.			
	A.	B.	C.	D.	A.	B.	C.	D.
°	"	"	"	"	"	"	"	"
0	— 0.15	+ 0.20	+ 1.45	+ 0.35	+ 1.28	+ .46	+ .36	+ .33
10	1.25	0.10	1.00	+ 0.30	.18	.36	— .09	+ .28
20	1.30	0.45	0.75	— 0.65	.13	.71	.34	— .67
30	0.80	0.80	0.55	— 0.25	+ .63	1.06	.54	— .27
40	2.00	+ 0.55	+ 0.85	+ 0.10	— .57	.81	.24	+ .08
50	0.70	— 0.10	— 0.70	— 1.25	+ .73	.16	1.79	— 1.27
60	1.50	— 0.10	+ 0.70	0.10	— .07	.16	.39	.12
70	1.00	+ 0.45	0.15	0.95	+ .43	.71	— .94	.97
80	1.50	0.10	1.25	1.50	— .07	.36	+ .16	1.52
90	0.95	0.75	1.25	1.00	+ .48	1.01	.16	1.02
100	0.90	0.40	1.45	— 1.15	+ .53	.66	.36	— 1.17
110	1.55	1.00	2.80	+ 1.10	— .12	1.26	1.71	+ 1.08
120	0.85	+ 1.10	1.15	— 0.25	+ .58	+ 1.36	.06	— .27
130	1.15	— 0.95	1.35	+ 0.25	+ .28	— .69	.26	+ .23
140	1.75	+ 0.60	1.10	— 1.75	— .32	+ .86	+ .01	— 1.77
150	1.55	— 0.30	0.50	0.70	.12	— .04	— .59	.72
160	1.55	0.05	2.15	— 1.25	.12	+ .21	+ 1.06	— 1.27
170	2.15	0.70	1.25	+ 0.50	.72	— .44	.16	+ .48
180	1.65	0.15	1.65	0.20	.22	+ .11	.56	.18
190	2.30	0.30	1.45	0.60	.87	— .04	.36	.58
200	1.65	— 0.95	1.15	0.65	.22	— .69	+ .06	.63
210	2.05	+ 0.05	1.05	0.35	— .62	+ .31	— .04	.33
220	1.20	+ 0.55	0.80	0.50	+ .23	+ .81	— .29	.48
230	3.05	— 0.70	1.15	0.50	— 1.62	— .44	+ .06	.48
240	1.55	— 0.25	0.65	1.00	1.12	+ .01	— .44	.98
250	2.65	+ 0.10	1.60	1.10	— 1.22	+ .36	+ .51	1.08
260	0.95	— 1.10	0.50	0.05	+ .48	— .84	— .59	.03
270	0.75	1.00	1.20	1.00	+ .68	.74	+ .11	.98
280	1.50	0.80	1.90	0.80	— .07	.54	.81	.78
290	1.35	0.40	1.15	0.45	+ .08	.14	.06	.43
300	1.15	0.95	1.55	1.55	.28	.69	.46	1.53
310	0.95	0.80	1.70	0.15	.48	.54	.61	.13
320	1.40	2.50	1.10	0.80	+ .03	2.24	.01	.78
330	1.50	1.55	1.90	1.30	— .07	1.29	.81	1.28
340	0.80	0.90	1.15	+ 0.35	+ .63	— .64	+ .06	+ 0.33
350	— 0.80	— 0.10	+ 0.90	— 0.10	+ .63	+ .16	— .19	— 0.12

II. JAN. 18, 1847.

	BSERVED RUNS.			DIFFERENCES FROM THE MEAN.			
	B.	C.	D.	A.	B.	C.	D.
	′	″	″	″	″	″	″
[illegible]	− 0.95	— 0.85	— 1.90	+ .98	+ .63	+ .01	+ .52
[illegible]	0.65	1.80	1.85	.43	.33	— .94	+ .57
[illegible]	1.50	1.00	3.50	.28	1.18	.14	— 1.08
[illegible]	1.00	2.80	2.60	.88	.68	1.94	— .18
[illegible]	1.30	2.00	1.95	.03	.98	1.14	+ .47
[illegible]	0.80	3.55	3.45	1.18	.48	2.69	— 1.03
[illegible]	0.70	2.45	3.20	.03	.38	1.59	.78
[illegible]	1.40	2.80	3.60	+ .58	1.02	1.94	1.18
[illegible]	1.10	1.40	3.45	— .37	.78	— .58	1.03
[illegible]	1.40	0.55	3.00	+ .53	1.08	+ .31	.58
[illegible]	0.70	0.35	3.25	+ .58	.38	.51	.83
[illegible]	0.90	0.00	2.80	— .42	.58	.86	.38
[illegible]	0.95	— 0.10	3.05	+ .48	.63	1.31	.63
[illegible]	0.55	+ 0.45	2.65	+ .33	.23	1.01	.23
.85	+ 0.95	0.15	4.15	— .47	+ .63	.86	1.73
.90	− 0.10	0.00	2.55	.52	— .42	1.51	.13
.60	+ 0.75	0.65	3.05	.22	+ .43	.91	— .63
.35	— 0.10	0.05	1.60	.97	— .42	1.11	+ .82
.60	+ 0.65	0.25	1.75	.22	+ .33	1.01	.67
.20	+ 0.75	+ 0.20	2.10	.82	+ .43	1.06	.32
.85	— 0.70	— 0.75	2.10	.47	— 1.02	.11	.32
.85	+ 0.45	0.45	2.20	1.47	+ .13	.41	.22
.05	+ 0.85	0.80	2.05	.67	+ .53	.06	.37
4.25	— 0.50	0.15	1.80	1.87	— .82	+ .71	.62
3.00	+ 0.35	1.55	2.40	.62	+ .03	— .69	.02
3.55	+ 0.10	1.25	1.90	— 1.17	— .22	.39	.52
2.30	— 0.45	1.10	2.35	+ .08	.77	.24	.07
1.70	+ 0.05	0.90	1.75	.68	.27	.04	.67
2.10	— 0.65	1.00	1.85	.28	.97	.14	+ .57
1.40	0.35	1.00	2.45	+ .98	.67	— .14	— .03
2.40	0.70	0.50	1.50	— .02	1.02	+ .36	+ .92
1.70	0.30	0.05	1.55	+ .68	.62	+ .81	.87
1.70	2.00	1.15	1.35	+ .68	2.32	— .29	1.07
2.50	0.50	0.60	2.00	— .12	.82	+ .26	.42
1.80	— 1.00	0.80	1.85	+ .58	1.32	+ .06	+ .57
— 2.15	+ 0.25	— 1.20	— 2.75	+ .23	— .07	— .34	— .33

III. JAN. 25, 1847.

	OBSERVED RUNS.				DIFFERENCES FROM THE MEAN.			
	A.	B.	C.	D.	A.	B.	C.	D.
°	"	"	"	"	"	"	"	"
5	— 2.75	+ 0.65	— 1.35	— 0.50	— .13	+ .52	— .10	— .86
15	1.35	1.15	1.55	0.10	+ 1.27	1.02	.30	+ .42
25	1.50	1.05	1.90	0.25	1.12	.92	.65	+ .21
35	1.80	0.55	2.80	0.75	.82	.42	1.55	— .36
45	2.25	0.55	2.85	— 0.90	.37	.42	1.60	— .44
55	1.70	0.55	4.20	+ 0.05	+ .92	.42	2.95	+ .30
65	3.10	0.65	2.50	— 1.00	— .48	.52	1.25	— .78
75	2.40	0.80	1.30	0.65	+ .22	.67	— .05	+ .01
85	2.90	1.25	1.25	0.80	— .28	1.12	.00	— .04
95	3.50	0.45	0.35	1.15	— .88	.32	+ .90	.48
105	2.15	1.80	0.60	1.15	+ .47	1.67	.65	.72
115	2.35	0.95	0.30	0.70	+ .27	.82	.95	.49
125	2.95	+ 0.75	0.50	0.75	— .32	+ .62	.75	.93
135	2.95	— 0.40	0.50	0.70	.33	— .53	.75	.86
145	2.65	+ 1.10	0.55	2.15	.03	+ .97	.70	2.35
155	3.80	— 0.80	0.75	— 0.35	1.18	— .93	.50	— .60
165	2.70	0.05	0.05	+ 0.60	— .08	.18	1.20	+ .47
175	2.55	0.95	0.05	0.05	+ .07	1.08	1.20	.02
185	3.20	— 0.90	— 0.65	0.75	— .58	— 1.03	.60	.77
195	3.50	+ 0.65	+ 0.10	1.10	.88	+ .52	1.35	.92
205	2.80	+ 0.05	— 0.65	0.60	.18	— .08	.60	.80
215	3.00	— 0.45	1.05	+ 0.30	.38	.58	+ .20	.50
225	3.25	0.00	2.00	— 0.05	.63	— .13	— .75	.27
235	4.75	+ 0.40	1.15	0.15	2.13	+ .27	+ .10	.18
245	3.00	— 0.95	2.80	0.20	— .38	— 1.08	— 1.55	.24
255	1.85	+ 0.30	2.05	— 0.25	+ .77	+ .17	.80	.50
265	2.50	+ 0.30	2.25	+ 0.50	.12	+ .17	1.00	.85
275	1.85	— 0.10	2.45	— 0.30	.77	— .23	— 1.20	.16
285	1.85	0.55	0.60	+ 1.25	.77	.68	+ .65	1.42
295	2.05	0.45	0.50	1.00	.57	.58	.75	.92
305	2.25	1.05	1.20	0.60	+ .37	1.18	.05	+ .60
315	2.80	0.45	1.00	0.65	— .18	.58	.25	— .05
325	3.00	2.20	0.50	+ 0.85	.38	2.33	.75	+ .75
335	2.65	— 0.45	1.25	— 0.50	— .03	— .58	.00	— .83
345	2.40	+ 0.55	0.80	+ 0.20	+ .22	+ .42	.45	.10
355	— 2.20	— 0.10	— 1.00	— 0.50	+ .42	— .23	+ .25	— .68

IV. MARCH 3, 1847.

	OBSERVED RUNS.				DIFFERENCES FROM THE MEAN.			
	A.	B.	C.	D.	A.	B.	C.	D.
°	″	″	″	″	″	″	″	″
5	— 1.20	+ 0.60	— 1.35	— 0.85	+ .34	+ 1.01	— .45	— 1.01
15	0.65	0.35	1.95	+ 0.05	.89	.76	1.05	— .11
25	1.15	+ 0.25	1.45	+ 0.35	.39	.66	.55	+ .19
35	0.90	— 0.05	2.00	— 0.75	.64	.36	1.10	— .91
45	1.45	— 0.40	1.70	0.85	.09	.01	.80	1.01
55	0.70	+ 0.20	4.00	0.20	+ .84	.61	3.10	.36
65	2.40	— 0.20	1.55	1.90	— .86	.21	— .65	2.26
75	1.20	0.00	0.85	— 0.65	+ .34	.41	+ .05	— .81
85	2.15	+ 0.80	1.55	+ 0.20	— .61	1.21	— .65	+ .04
95	2.30	— 0.30	— 0.15	— 0.30	.76	.11	+ .75	— .46
105	1.75	+ 0.70	+ 0.55	— 0.70	— .11	1.11	1.45	— .86
115	0.90	0.00	0.10	+ 0.20	+ .64	.41	1.00	+ .04
125	1.85	+ 0.15	+ 0.10	— 0.55	— .31	+ .56	1.00	— .71
135	1.80	— 0.90	— 0.30	0.75	— .26	— .49	.60	.91
145	1.00	0.10	— 0.05	— 1.55	+ .54	+ .31	.85	1.71
155	2.50	1.60	+ 0.15	0.00	— .96	— 1.19	1.05	— .16
165	1.95	1.00	— 0.75	+ 0.90	— .41	.59	.15	+ .74
175	1.40	1.00	+ 0.35	0.70	+ .14	.59	+ 1.25	.54
185	1.80	— 0.95	— 1.15	1.15	— .26	— .54	— .25	.99
195	2.35	+ 0.25	+ 0.35	1.45	.81	+ .66	+ 1.25	1.29
205	1.75	— 0.20	— 0.05	1.15	.21	+ .21	.85	.99
215	2.05	0.90	0.50	+ 0.35	.51	— .49	+ .35	+ .19
225	2.45	0.40	1.25	— 0.80	.91	+ .01	— .35	— .96
235	2.90	0.00	0.50	+ 0.50	1.36	+ .41	+ .40	+ .34
245	1.65	1.10	2.15	+ 0.15	— .11	— .69	— 1.25	— .01
255	0.70	0.20	1.70	— 0.05	+ .84	+ .21	.80	— .21
265	1.35	0.40	1.85	+ 1.05	.19	+ .01	.95	+ .99
275	1.05	0.55	1.70	— 0.20	.49	— .14	— .80	— .04
285	1.15	1.30	0.50	+ 2.00	.39	.89	+ .40	+ 1.84
295	1.10	0.80	0.50	1.55	.44	.39	.40	1.39
305	1.10	1.50	0.85	1.65	.44	1.09	.05	1.49
315	1.45	1.20	0.25	0.25	+ .09	.79	.65	.09
325	1.55	1.95	0.15	0.95	— .01	1.54	+ .75	.79
335	1.75	— 0.85	1.40	0.45	— .21	— .44	— .50	.29
345	1.00	+ 0.25	1.25	0.45	+ .54	+ .66	— .35	.29
355	— 0.95	— 0.45	— 0.45	+ 0.25	+ .59	— .04	+ .45	+ .09

To determine the law of the errors under a single microscope, we may proceed in the following manner. It is evident that the division under microscope A, at the zenith distance z, is under B, C, and D, at $z+90°$, $z+180°$ and $z+270°$, respectively. Taking, therefore, the difference from the mean of A, B, C, D, at z. $z+90°$, $z+180°$ and $z+270°$, respectively, we have four determinations of the same quantity: the mean of these determinations in each of the above series gives:

	I.	II.	Mean = Δ R.		III.	IV.	Mean = Δ R.
°	"	"	"	°	"	"	"
0	+ .95	+ .93	+ .94	5	+ .16	— .05	+ .05
10	.49	.61	.55	15	1.51	+ 1.26	1.38
20	.47	.21	.34	25	.92	.76	.84
30	+ .87	.71	+ .79	35	.59	+ .76	+ .68
40	— .35	.30	— .02	45	.00	— .18	— .09
50	+ .61	+ .90	+ .75	55	+ .61	+ .59	+ .60
60	.18	— .16	.01	65	— .83	— .76	— .80
70	+ .37	+ .30	+ .33	75	.11	.16	.14
80	— .30	— .34	— .32	85	.68	.51	.59
90	+ .26	+ .33	+ .29	95	— .85	— .78	— .82
100	+ .39	+ .36	+ .37	105	+ .44	+ .19	+ .31
110	— .35	— .66	— .50	115	+ .20	+ .35	+ .27
120	+ .27	+ .20	+ .23	125	— .36	— .40	— .38
130	+ .44	+ .53	+ .48	135	— .25	— .15	— .20
140	— .50	— .65	— .57	145	+ .34	+ .32	+ .33
150	+ .14	.25	.05	155	— .80	— 1.02	— .91
160	— .17	.39	.28	165	.01	— .32	— .16
170	.82	.78	.80	175	.06	+ .16	+ .05
180	.40	.26	.33	185	.50	— .34	— .42
190	— .67	.89	.78	195	.69	.92	.80
200	+ .09	.41	.16	205	.48	.28	.38
210	— .53	1.26	.89	215	.95	.84	.90
220	.08	.66	.37	225	.84	.84	.84
230	1.85	2.15	2.00	235	2.36	1.92	2.14
240	.63	.79	.71	245	— .60	— .34	— .47
250	— 1.02	— 1.26	— 1.14	255	+ .46	+ .58	+ .52
260	+ .32	+ .06	+ .19	265	.03	.00	.02
270	.37	.57	.47	275	.76	.82	.79
280	.31	.36	.33	285	.91	.96	.93
290	.78	.83	.80	295	.83	.78	.80
300	.43	.55	.49	305	.48	+ .50	.49
310	.51	.76	.63	315	.26	— .06	.10
320	.17	.66	.41	325	.19	+ .46	.32
330	.12	.45	.28	335	.23	.26	.24
340	.87	.76	.81	345	.51	.22	.36
350	+ .29	+ .55	+ .42	355	+ .90	+ .89	+ .90

The expression of the variation of runs under a single microscope has the general form:

$$a. \sin(z+A) + b. \sin(2z+B) + c. \sin(3z+C) + \&c.$$

The observations given above, therefore, furnish seventy-two equations of the form

$$o = -\Delta R + \sin z. a. \cos A + \cos z. a. \sin A + \sin 2z. b \cos B + \cos 2z. b \sin B + \&c.,$$

in which the quantities Δ R and the co-efficients, sin z cos z. sin $2z$, &c., are known, and the quantities a.

cos A, *a* sin A, *b*. cos B, &c., are to be determined by the method of least squares. The solution of the equations gives for the numerical expression of the correction of observed runs

$$d\Delta R = 0''.603 \sin(z + 270^\circ\ 6'.3) + 0''.273 \sin(2z + 355^\circ\ 40'.9) + 0''.267 \sin(3z + 161^\circ\ 46'.3) + 0''.251 \sin(4z + 214^\circ\ 14'.1) + \&c.$$

Applying these corrections to the ΔR given above, we have the sum of the squares of the remaining errors = 11″.657; if the first term only be applied, the sum of the squares is = 19″.165; and if the correction be wholly neglected, it is = 32″.166. Remembering that each ΔR given above is the mean of four determinations, we have the probable error of a single observed ΔR = ± 0″.547; and comparing this with the probable error of a single determination of runs as before given, we obtain the probable error of a single division = ± 0″.699, which is certainly not too large.

Under the mean of four microscopes, all the terms of the general form of correction of runs vanish excepting those depending on *n* 4 *z*. Another and independent solution of equations similar to the above was made, and the correction for the mean of runs under the four microscopes found to be

$$d\Delta R = 0''.258 \sin(4u + 219^\circ\ 45'.0) + 0''.060 \sin(8u + 160^\circ\ 18'\ 7) + \&c.$$

These terms may be sufficiently explained by the evident traces of a blow which the circle has received, probably in transportation. The mark of the blow is under that part of the circle which corresponds, under microscope A, to *z* = 43°±

At the same time that the observations of runs quoted above, were made, several sets of circle readings were taken for the purpose of determining the relation of the readings of a single microscope to the mean of the four. These readings were referred to the mean of there consecutive divisions by applying to the reading of the middle division, a correction deduced from the errors of runs given above. The readings themselves and the corrections to be applied are as follows:

	I. JANUARY 2, 1847.				CORR. OF	II. JANUARY 18, 1847.			
	A.	B.	C.	D.	A. B+90° C+180 D+270	A.	B.	C.	D.
°	″	″	″	″	″	″	″	″	″
0	62.3	60.8	56.0	60.2	+ 1.2	62.9	66.1	65.8	61.4
10	65.3	57.0	56.5	60.4	— 0.4	64.8	62.1	64.6	62.1
20	65.5	58.2	59.0	60.8	+ 0.5	62.4	59.9	63.4	60.2
30	66.6	56.9	63.4	59.8	— 0.5	65.8	62.0	63.1	62.6
40	67.2	56.8	62.8	60.4	0.3	62.0	56.5	57.2	58.9
50	67.6	56.0	56.0	61.6	0.4	67.5	61.5	65.0	64.1
60	68.7	59.5	58.2	60.5	— 0.1	61.2	56.9	60.1	57.1
70	68.8	61.3	57.7	61.4	+ 0.4	65.6	63.0	64.2	61.4
80	66.9	60.9	59.0	61.3	+ 0.6	60.8	58.9	61.8	58.0
90	69.0	60.0	59.0	60.3	0.0	64.5	60.0	63.6	57.1
100	67.9	60.7	54.5	62.0	— 1.2	64.6	65.0	61.7	60.0
110	66.4	61.1	55.0	60.9	— 0.4	64.9	65.0	62.0	61.8
120	67.1	65.1	57.9	61.0	— 0.5	69.0	72.8	68.0	65.9
130	68.6	67.6	59.0	61.0	0.0	64.3	68.2	64.2	60.2
140	67.1	66.4	58.5	62.2	— 0.6	64.0	68.8	64.0	61.8
150	64.7	64.2	58.1	61.2	— 0.5	62.9	68.7	66.2	63.0
160	65.3	64.8	59.8	60.8	+ 0.4	67.1	72.4	70.5	66.1

	I. JANUARY 2, 1847.				CORR. OF {A. B+90° C+180 D+270}	II. JANUARY 18, 1847.			
	A.	B.	C.	D.		A.	B.	C.	D.
°	″	″	″	″		″	″	″	″
170	64.5	62.2	58.0	60.3	— 0.2	64.4	67.9	67.0	62.9
180	65.8	65.9	58.1	60.8	+ 0.5	61.4	66.7	62.0	57.5
190	70.2	69.3	64.8	61.0	0.0	65.3	69.2	66.8	57.5
200	72.1	68.4	63.5	61.0	— 1.0	64.1	65.0	64.0	56.0
210	67.1	63.9	61.0	58.9	— 0.6	61.1	62.4	64.5	56.0
220	66.2	64.0	61.2	59.2	0.0	66.3	70.2	70.0	62.2
230	68.8	63.7	61.8	59.4	0.0	63.5	64.5	66.0	58.4
240	69.4	61.6	60.0	60.2	+ 0.1	63.2	60.3	63.2	57.2
250	68.5	62.8	60.5	61.3	+ 1.1	61.5	61.0	63.0	58.2
260	67.9	61.9	59.1	60.9	+ 0.7	64.2	62.0	63.5	60.0
270	66.3	60.8	61.0	59.2	+ 0.2	62.2	62.0	65.4	56.3
280	61.5	60.7	60.5	60.7	+ 0.1	66.2	71.3	73.7	67.5
290	63.0	64.0	61.1	61.5	+ 0.6	62.9	69.6	70.0	64.5
300	61.0	59.2	58.9	59.5	— 0.3	61.1	64.5	67.3	62.9
310	61.1	59.4	59.5	60.9	+ 0.4	65.3	70.0	72.6	68.0
320	61.4	62.3	60.0	61.1	— 0.4	62.2	69.5	70.0	66.3
330	61.2	63.3	57.2	59.9	— 0.4	65.9	72.4	70.5	67.1
340	64.3	61.3	59.8	62.7	— 0.6	63.4	67.0	67.0	64.0
350	65.3	63.7	60.9	61.0	— 0.1	65.3	69.2	68.5	64.6
	III. JANUARY 25, 1847.					IV. MARCH 3, 1847.			
5	62.0	61.2	63.5	57.1	— 0.1	61.5	57.3	56.0	54.7
15	61.1	60.5	60.3	54.3	+ 0.1	62.6	56.9	57.2	57.9
25	70.0	65.1	66.2	60.5	— 1.2	63.7	53.4	55.0	55.4
35	66.0	60.7	64.0	58.1	— 0.2	64.4	53.3	57.2	57.0
45	66.7	61.8	63.7	59.0	+ 0.1	61.9	51.5	53.7	54.8
55	64.7	60.8	61.5	57.8	0.2	63.1	54.8	55.5	56.2
65	62.8	59.5	62.2	53.8	0.4	64.0	54.9	57.0	55.3
75	64.0	59.9	63.8	55.3	+ 0.5	64.0	55.0	58.0	56.4
85	64.6	62.9	63.9	55.3	— 1.2	64.1	57.0	57.2	55.1
95	64.5	62.9	61.2	55.1	0.0	62.4	52.8	54.0	55.4
105	62.0	63.7	63.1	54.3	+ 0.4	62.6	59.0	57.2	55.6
115	66.8	71.8	66.2	59.0	— 0.1	63.8	64.1	58.3	57.8
125	67.5	72.1	67.1	62.1	— 0.8	62.7	61.8	57.1	58.9
135	69.0	74.0	69.8	61.6	+ 0.3	63.7	63.3	58.9	57.5
145	67.4	72.7	70.0	62.0	0.6	63.0	61.8	59.3	58.5
155	64.5	70.3	67.4	61.1	0.3	62.9	63.0	60.0	60.5
165	66.0	71.8	68.0	61.5	+ 0.1	64.1	64.8	61.3	61.1
175	63.0	68.6	67.6	57.2	— 0.2	62.3	64.2	60.5	57.2
185	65.5	71.4	69.3	57.1	+ 0.1	62.2	62.3	60.0	54.1
195	63.1	67.4	67.1	55.9	+ 0.5	63.4	62.2	61.7	57.4
205	67.1	70.6	71.5	58.3	0.0	63.3	62.2	62.9	55.8
215	67.2	69.9	69.8	56.4	— 0.8	62.9	58.1	59.7	52.8
225	62.9	65.4	66.6	54.2	+ 0.9	64.0	62.0	62.7	56.7
235	61.8	62.6	63.9	53.4	+ 1.2	64.1	60.2	60.4	56.0
245	67.0	65.6	67.1	57.8	0.0	62.2	54.3	57.2	54.0
255	63.4	61.5	64.5	53.8	— 0.2	63.6	57.3	59.5	54.5
265	64.5	64.0	68.0	58.2	+ 0.2	64.0	59.8	61.4	58.8
275	59.5	61.8	65.7	54.8	+ 0.8	62.2	59.0	61.9	58.8
285	63.4	67.0	68.3	59.5	— 0.3	61.7	60.0	61.3	58.8
295	63.0	68.4	69.8	63.0	— 0.2	64.5	64.7	65.1	66.0

	III. JAN. 25, 1847.				A. B+90° C+180 D+270	IV. MARCH 3, 1847.			
	A.	B.	C.	D.		A.	B.	C.	D.
°	"	"	"	"	"	"	"	"	"
305	66.0	73.8	73.1	65.5	+ 0.1	63.1	66.4	65.2	64.8
315	64.0	69.8	71.5	63.1	0.2	62.8	64.0	64.9	64.0
325	66.2	72.1	72.0	63.8	+ 0.3	61.9	63.0	62.6	60.1
335	65.7	72.3	70.1	63.7	— 0.1	62.0	62.6	60.3	60.2
345	63.0	70.6	68.1	61.3	+ 0.9	62.4	65.5	62.9	62.4
355	67.0	70.2	68.9	62.2	— 1.2	62.0	59.0	58.0	59.8

After applying these corrections, the readings were rendered independent of the accidental positions of the microscopes, relatively to each other, and to the exact commencement of the given degree, by first subtracting the reading of each microscope from the mean of the four, and then subtracting the remainder from the mean of all the readings of the same microscope. In this way two determinations are made of the reduction of each microscope to the mean, at each five degrees of the circle. The reductions for B + 90°, C + 180° and D + 270°, are assumed the same as for A. The following Table contains the observed reductions and the means of the eight observations :

	A.		B + 90°		C + 180°		D + 270°		
	I.	II.	I.	II.	I.	II.	I.	II.	Mean.
°	"	"	"	"	"	"	"	"	"
0	+ .87	+ .35	+2.06	+2.56	+1.12	+ .68	+1.23	+2.44	+1.41
5	— .18	— .82	.68	+3.20	— .61	— .59	+ .05	— .45	+ .16
10	1.41	1.45	+ .25	—1.27	1.15	.58	—1.59	.91	—1.01
15	1.41	.86	— .69	— .97	1.08	.99	— .98	— .91	.97
20	1.13	1.57	+1.43	+ .63	.52	.80	+ .45	+ .47	.01
25	3.15	2.98	—3.66	—3.73	1.23	1.56	—3.02	—3.53	2.86
30	.83	2.47	2.20	2.47	.95	1.98	1.09	1.54	1.69
35	3.46	3.63	1.96	1.55	1.63	2.09	1.22	1.78	2.16
40	1.01	3.10	3.52	2.67	.98	1.00	2.01	1.71	2.00
45	3.05	3.13	3.36	3.23	1.48	1.62	2.22	2.83	2.61
50	3.18	2.99	3.20	3.22	1.02	1.35	1.62	2.36	2.37
55	2.56	2.30	2.74	2.03	.53	.39	1.60	1.06	1.65
60	3.03	2.57	2.47	2.54	.03	.85	1.19	1.16	1.73
65	2.91	3.43	1.77	1.50	.41	1.07	1.30	1.01	1.68
70	2.51	2.20	2.90	2.87	.00	.65	2.81	2.13	2.01
75	2.85	2.82	1.89	1.70	—1.31	—1.49	.72	.81	1.70
80	1.23	1.35	1.39	1.52	+ .30	+ .07	.10	.86	.76
85	1.75	2.13	2.74	4.20	—1.15	— .34	1.63	—3.13	2.13
90	2.38	2.79	2.98	3.24	1.40	1.95	1.47	+ .21	2.00
95	2.81	3.03	3.62	3.50	2.48	1.76	2.45	— .16	2.48
100	1.88	1.02	3.44	3.70	1.53	1.70	2.44	1.89	2.20
105	.88	1.20	.99	.80	1.41	1.62	.48	1.01	1.05
110	1.41	1.22	2.82	2.12	1.08	1.42	1.97	2.11	1.77
115	.55	.06	1.34	1.57	1.45	.82	— .92	.93	.95
120	— .23	— .12	1.34	.30	1.92	1.83	+ .33	2.11	.94
125	+ .65	+ .82	—2.04	— .50	— .55	— .49	—2.13	—1.78	— .75

	A.		B + 90°		C + 180°		D + 270°		
	I.	II.	I.	II.	I.	II.	I.	II.	Mean.
°	″	″	″	″	″	″	″	″	″
130	— .46	— .12	—1.72	—2.12	—1.95	—2.10	— .34	—3.34	—1.52
135	+ .22	+ .24	.39	.73	1.75	1.44	1.72	1.38	.87
140	.77	.83	— .21	— .07	1.25	1.25	2.62	2.23	.75
145	1.17	.64	+ .66	.00	— .93	—1.27	—2.03	.75	— .31
150	1.69	2.51	1.37	+2.13	+ .78	+ .25	+ .03	— .81	+ .99
155	1.74	1.57	1.58	2.62	+ .27	+ .28	.32	+ .52	1.11
160	1.37	1.78	1.41	2.13	— .55	— .22	+ .46	+ .36	.84
165	1.62	1.97	1.28	.60	+ .45	+ .08	— .82	— .86	.54
170	1.27	1.53	.90	2.05	— .43	.35	— .27	— .49	.61
175	1.27	1.37	2.84	1.55	+ .34	+ .76	+1.28	+1.62	1.38
180	.89	.41	.31	.03	1.10	— .28	— .32	+ .77	.36
185	+ .99	+ .56	1.51	+1.53	.12	+ .93	+ .42	—1.18	+ .61
190	— .18	—1.05	.17	— .32	.22	— .08	—2.01	+ .14	— .39
195	+ .52	+ .47	+ .18	+ .27	.99	+ .58	+ .85	+ .85	+ .59
200	— .85	— .97	—2.17	—2.14	.10	.50	—2.25	—1.66	—1.18
205	.03	+ .40	+1.04	+ .95	+1.45	.96	+2.08	+1.79	+1.08
210	.28	— .05	+ .48	+ .75	—4.30	1.90	+ .43	+ .34	— .09
215	— .43	—1.13	—1.86	—2.00	+1.14	.61	— .82	—1.23	— .71
220	+ .55	+ .83	+1.16	+ .58	—3.68	2.97	+2.01	+1.65	+ .78
225	— .58	— .16	+ .14	— .05	+1.15	.71	1.58	1.39	+ .52
230	1.65	.82	—1.05	1.17	1.25	.68	.03	.19	— .32
235	1.43	1.53	.64	.98	1.64	+ .74	+ .70	+ .29	.15
240	2.86	2.62	3.01	2.27	.50	— .10	— .65	— .63	1.45
245	1.91	2.12	—2.04	1.83	.09	+ .41	—1.23	—1.38	1.25
250	1.93	1.42	+ .65	.44	1.12	.07	+ .44	+ .14	.17
255	1.51	1.33	—2.46	2.63	+ .05	+ .33	— .55	— .68	1.10
260	1.83	2.30	—1.32	—1.37	— .10	— .88	— .77	— .41	—1.12
265	1.05	.78	+ .03	+1.05	— .45	.19	+1.80	+2.22	+ .33
270	— .13	— .52	— .50	— .30	+ .65	— .52	.95	2.17	.22
275	+ .92	+ .70	+2.51	+ .02	1.69	+1.01	3.22	3.52	1.70
280	2.94	2.93	3.63	3.40	3.65	2.15	4.79	5.31	3.60
285	2.19	2.24	.88	1.27	.72	1.34	1.55	1.32	1.44
290	2.79	3.11	3.00	3.18	2.22	2.25	4.21	3.89	3.08
295	3.45	3.42	2.64	2.95	2.15	1.98	2.60	2.75	2.74
300	2.55	2.60	4.81	2.68	2.00	2.25	2.48	2.31	2.71
305	3.65	4.27	4.43	4.80	2.15	1.96	4.10	3.72	3.64
310	2.82	3.23	5.02	3.45	1.97	1.15	2.12	2.29	2.76
315	3.85	4.32	3.64	3.80	1.55	1.58	2.45	2.49	2.96
320	3.92	4.78	4.56	4.56	2.40	2.20	2.91	2.24	3.45
325	3.17	3.28	2.93	2.33	.87	1.08	1.30	1.92	2.11
330	3.45	3.18	2.50	3.48	1.42	.68	1.50	1.34	2.19
335	3.07	2.54	2.48	2.50	1.24	1.31	.72	+ .54	1.80
340	2.72	2.81	.93	1.75	1.10	.95	.54	— .06	1.23
345	2.75	3.34	3.64	3.32	.82	.41	1.52	+2.22	2.25
350	1.84	1.88	1.60	2.70	+ .90	.40	+ .63	+ .16	1.26
355	+1.24	+1.32	+ .94	+ .70	— .33	+ .61	— .62	— .43	+ .43

The general expression of the reduction of a single microscope to the mean has the same form as that given above for the reduction of runs. The solution of the equations furnished by the readings, gives for the numerical value of this reduction

$$1''.538 \sin (z + 170^\circ\ 21'.2) + 1''.402 \sin (2\,z + 159^\circ\ 31'.7) + 0''.618 \sin (3\,z + 246^\circ\ 32'.7) + 0''.008 \sin (4\,z + 344^\circ\ 35')$$

The first term is occasioned by the excentricity of the graduated arc; the second has the form of correction required by an elliptical figure of the pivots, and the third may be due either to a deviation from this elliptical figure, or to a periodical error of division. It must be borne in mind that the existence of the second term by no means demonstrates a simply equivalent motion of the axis in azimuth, as we have here the effect of but one erroneous pivot, while the true deviation is the sum of the effects of both, and would require for its complete determination another circle at the opposite end of the axis. The errors of the two pivots may compensate each other, and the result be simply a translation of the axis in the direction of the meridian, or they may unite to increase the deviation in azimuth. It is easy to ascend from the second term of the above expression (assuming it to be caused by error of the pivot nearest the circle) to the corresponding correction of observed Right Ascensions; and thence by comparison with tabular values to estimate the probability of error of the other pivot. The maximum deviations of the optical axis from the great circle, as shown by this term, take place at $z = 55^\circ\ 14' + n.\ 90^\circ$. The co-efficient, $1''.402$, indicates, at these values of z, an equivalent rotation of the alidade system around a point below it, and in the axis of the antagonist screws which prevent the revolution on the principal axis. The distance of this point from the centre of the alidade is 17.7 in.; the distance between the alidade and the centre of the farthest pivot is 36.2 in. The maximum deviation of the optical axis from the great circle, as produced by the error in question, is therefore $= 1''.402\,\frac{17.7}{36.2} = 0''.685 = \overset{s.}{0}.0457$. The correction of an observed transit is consequently:

$$= \overset{s.}{0}.0457 \sec \delta \sin (2z + \overset{\circ}{159}\ \overset{\prime}{31}.7.)$$

$$= 0.0457 \sec \delta \sin (2\,\delta + 81\ 44.2.)$$

Denoting by Δt and $\Delta t'$ the corrections for two stars from which the value of $(n + c)$ has been determined, and of which the first is nearest the pole, the correction of this erroneous $(n + c)$ is $l.\ (\Delta t - \Delta t')$, the coefficient l being given in Table XXVIII in Appendix to Vol. I. The correction of the computed time of transit is $dm + dn.\ \tan \delta = dn\ (\tan \delta - \tan \phi)$ and, finally, the correction of a computed Right Ascension is equal to $\Delta t - dn.\ (\tan \delta - \tan \phi)$. The "computed $\Delta \alpha$" in the following Table is the correction of the observed Right Ascensions, on the hypothesis that the term depending on $2\,z$, which we have been considering, is caused by an erroneous figure of the circle pivot. The "observed $\Delta \alpha$" is the excess of the uncorrected Right Ascensions over the tabular values:

Dec.	Computed Δα.	Observed Δα.	No. of Stars.
°	s.	s.	
— 35	+ .06	+ .03	1
30	.04	— .06	2
25	.03	+ .01	3
20	.02	+ .01	4
15	+ .01	— .04	4
10	.00	— .14	4
— 5	.00	+ .03	2
0	— .01	+ .01	3
+ 5	.01	— .03	9
10	.02	.02	4
15	.02	.07	8
20	.02	.09	4
25	.02	.07	6
30	.02	.08	6
35	.02	.07	1
40	.02	.04	3
45	.02	.08	2
50	.02	.08	6
55	.01	— .08	2
60	.01	+ .08	2
65	— .01	— .08	1
+ 70	.00	— .19	2

Thus we see that the actual error is much greater than can be explained by the term depending on 2 z alone, and the *a priori* probability of error in the second pivot becomes confirmed. As has been said above, another investigation will be made by means of transits of circumpolar stars, and it is hoped that the increased accuracy in observations of this kind will soon lead to a satisfactory determination of these errors.

The value of the reduction, as given by the above expression, is to be applied to the readings of a single microscope, when this only has been observed, to reduce them to the mean of four. The zenith point for such an observation, must, of course, be taken by the same microscope alone, and corrected by the same formula.

As regards periodical errors of division, no attempt has been made to determine them. The accidental errors are large, much larger than might have been anticipated from the reputation of the makers of the instrument, as is sufficiently shown by the above circle readings. It is in contemplation, therefore, to determine, at present, rather the error of special divisions, such as are used for the standard stars, with reference to the divisions at the nadir. Additional microscopes for examining the circle have been ordered, and when received, will facilitate the whole investigation.

The following changes were made in the system of wires in the diaphragm of the eye-piece during the year 1846. On the 6th of February two of the transit wires were broken out while changing eye-pieces, and were immediately replaced by Lieut. Maury. February 18, the whole system was broken out and replaced. On the 28th of March the new arrangement of wires mentioned above (p. xxxviii) was adopted, the micrometer plate of the diaphragm being turned 90°, to be used in measuring differences of declination, and seven micrometer wires and four additional transit wires inserted. The designation of the transit wires is thus: 1, 2, A. B. C. D. E. F. G., 10, 11. The adopted values of the equatorial intervals for the year, are as follows:

	Mean—A.	Mean—B.	Mean—C.	Mean—D.	Mean—E.	Mean—F.	Mean—G.
	s.	s.	s.	s.	s.	s.	s.
Jan. 1 to Feb. 6.	+ 31.377	+ 20.923	+ 10.473	+ 0.160	— 10.581	— 21.128	— 31.229
Feb. 6 to Feb. 18.	31.411	21.014	10.199	0.202	10.520	21.059	31.183
Feb. 18 to Mar. 28.	31.549	21.010	10.556	+ 0.100	10.584	21.240	31.391
Mar. 28 to Dec. 31.	+ 32.903	+ 21.791	+ 10.964	— 0.026	— 10.877	— 21.934	— 32.816

Of the "supplemental wires," only the two which follow the regular system have been used: the intervals of these from the mean are respectively —49s.31 and —60s.49. These values, with the exception of the two last, have been deduced from transits of Polaris and δ Ursæ Minoris, and obtain for the centre of the field. For the Zone Observations, where the stars have been observed at various distances from the centre, it becomes important to determine the errors of the transit-wires throughout their whole length: for this purpose the Zones themselves have been consulted, and the following Table deduced:

MAR. 28 to DEC. 31.

	MEAN — A.	— B.	— C.	— D.	— E.	— F.	— G.	— 10.	— 11.
rev.	s.	s.	s.	s.	s.	s.	s.	s.	s.
0	+ 32.99	+ 21.96	+ 11.03	—.03	— 10.94	— 22.00	— 32.94	—49.05	—60.42
10	.99	.93	.02	.03	.93	.01	.94	.13	.44
20	.99	.90	.02	.03	.92	.03	.95	.20	.46
30	.98	.87	.01	.03	.92	.05	.96	.26	.48
40	.98	.84	.00	.03	.91	.06	.97	.30	.48
50	.98	.81	.00	.03	.90	.04	.96	.30	.45
60	.97	.78	.01	.03	.90	.01	.94	.29	.40
70	.97	.75	.01	.03	.89	21.98	.91	.27	.33
80	+ 32.97	+ 21.72	+ 11.01	—.03	— 10.89	— 21.95	— 32.88	—49.25	—60.25

An attempt was made, by computing the intervals independently at the proper seasons of the year, to ascertain if they were constant or variable with the temperature or other causes. They were found almost always smaller in high temperatures, showing an apparent correction, but with an effect so slight as to be practically of little or no importance. The intervals in both tables given above, were deduced from observations made during the whole period for which they have been used. In reducing "broken transits," the correction to the mean of the observed wires has been obtained by multiplying the mean of the equatorial intervals for those wires, by the secant of the star's declination.

The inclination of the axis of the instrument relatively to the horizon, has been obtained for each date of observation, by means of the striding level, in the manner already explained, (p. xxxviii.) When the readings on successive days have indicated no great or sudden variations, they have been assumed as so many determinations of the same quantity, and the mean of them taken as the most probable value of the inclination for that period. The following are the values, denoted by *b*, which have been employed in the subsequent reductions; the positive sign indicating that the West end is highest:

	b.		*b.*
	s.		s.
Jan. 1 to Jan. 27	— .335	May 27 to June 21	+ .264
Jan. 27 to Feb. 2	+ .018	June 21 to Aug. 1	.171
Feb. 2 to Feb. 18	— .009	Aug. 1 to Aug. 28	.219
Feb. 18 to Mar. 9	— .125	Aug. 28 to Sept. 21	+ .115
Mar. 9 to Mar. 28	+ .122	Sept. 21 to Nov. 23	— .062
Mar. 28 to May 13	.199	Nov. 23 to Dec. 31	— .369
May 13 to May 27	+ .133		

To determine the error of collimation, the distance of the middle transit-wire from its image reflected from a surface of quicksilver, was estimated at every observation of the nadir-point. During the first three months of 1846, the thickness of the wires was the only guide in this estimation: after the micrometer plate had been introduced, the practice was to place the micrometer wire at an equal distance from the fixed horizontal wire, thus forming a small square in the centre of the field. So long as this distance varied only within the probable limits of the errors of observation, it was assumed as constant, and the mean of the estimations taken as its most probable value for the period.

If we denote this value, expressed in seconds of time, and positive when the image is E, by s, then the constant of correction for the middle wire is $= \frac{1}{2} s + b$. Applying to this the reduction of wires and the constant of diurnal aberration, we have the following values, employed in the reductions for 1846:

	c.		*c.*
	s.		s.
Jan. 1 to Jan. 27	— .448	May 28 to June 27	+ .247
Jan. 27 to Feb. 6	+ .041	June 27 to Aug. 3	.330
Feb. 6 to Feb. 16	+ .117	Aug. 3 to Aug. 31	.230
Feb. 16 to Mar. 9	— .098	Aug. 31 to Sept. 5	.115
Mar. 9 to Mar. 28	— .076	Sept. 5 to Oct. 25	.022
Mar. 28 to Apr. 28	+ .246	Oct. 25 to Nov. 21	.351
Apr. 28 to May 28	+ .207	Nov. 21 to Dec. 31	+ .192

The remaining errors of position of the instrument were determined by help of the observations themselves, in the manner described in the Preface to Vol. I, p. xlv., and Appendix, p. [81]; the observed transits being first corrected by the quantity c (sec δ — tan δ), and then the value of $(n + c)$ obtained by comparing the transit of a circumpolar star with all the others observed on the same evening: the mean of the results furnishing $(n + c)$. These values for successive evenings through the year were grouped as in the determinations of b and c, as were also those of the quantity m. The adopted values of m, n and c, are given, with their corresponding dates, at the foot of the printed observations. The correction $m + (n + c) \tan \delta + c (\sec \delta - \tan \delta)$ having been applied to all the observed transits, the clock correction was obtained by comparing the corrected transits of such fundamental stars as had been observed with their tabulated places: the values of this correction are also given at the foot of the printed observations, together with the deduced hourly rate of the clock.

The micrometer wires of the diaphragm are designated by the numbers 1, 2, 3, 4, 5, 6, 7, of which 1, with the circle E. and the observer looking S., is the uppermost in the field. The distances between these wires and the middle one, have been determined by means of the collimating eye-piece and circle-readings; each wire being made to coincide either with its own image or that of wire 4. The mean of all the determinations gives:

4 — 1	4 — 2	4 — 3	4 — 5	4 — 6	4 — 7
— 20′ 30″.25	— 14′ 38″.54	— 5′ 55″.42	5′ 46″.13	14′ 28″.94	20′ 19″.03

The value of one revolution of the micrometer-screw has been obtained from the intervals 4 — 3 and 4 — 5, by comparing the coincidences of wires 3, 4, 5 with the fixed wire. The mean of all the determinations gives 34″.433 for this value. The above intervals, expressed in revolutions of the micrometer-screw, furnish each a constant to be applied to the micrometer reading, whenever the corresponding wire has been used in the observation. The micrometer correction to be applied to the circle reading is $C_f + m - C$, where C_f denotes the above constant, m denotes the micrometer reading corresponding to wire 4, and C the coincidence of wire 4 with the fixed wire.

The correction for runs has been determined and applied in the same manner as for the Mural Circle. The effect of variations of temperature in itself much less than where the microscopes are attached immediately to the stone pier, as with the Mural, is here completely masked under the large errors of graduation and of reading off; and an attempt to ascertain the law of any such effect, may be considered as quite hopeless. The adopted values of the error of runs for each night of observation, are given at the foot of the page in the printed observations.

The Nadir Point on the circle has been determined at least once, and often twice, on each date, by the collimating eye-piece. The details of these determinations, with the adopted values, accompany the observations themselves: and occupy part of the pages containing the latter.

The refractions have been computed from the tables prepared by Prof. Coffin, and inserted in the Appendix to Vol. I, (pp. 59 to 71.) The horizontal parallaxes, for the Sun, Moon and Planets, were computed from their tabular distances from the Earth, as given in the Nautical Almanac.

The corrections for runs, zenith-point, refraction, and where necessary for micrometer reading, parallax and semi-diameter having been duly applied to the mean of the four microscope readings, the true geocentric zenith distance was obtained, counted in accordance with the numbering of the graduations on the circle, from the zenith towards the North, the southern distances being given as less than 360°, or negative. The addition of the Latitude, assumed as 38° 53′ 39″.25, gave the required declination of the object.

To facilitate the reductions of the stars' apparent places, to the adopted mean equinox of 1850.0, a table was prepared containing for each eighth day, the logarithms of the quantities denoted by A, B, C, D, in the "Formulæ of Reduction, &c.," of the Nautical Almanac, (1850, p. 459;) substituting, however, the quantity $t - 4$ for t in the expression for C. With these values, the "Independent Constants" were computed, and thence interpolated for each day of the year. For stars that have been often observed, the reductions were computed for each eighth or tenth day between the extreme dates, and thence interpolated for each observed culmination: for other stars the reductions were computed independently for the date.

All the reductions of the observations both in Æ and Dec. have been performed by Prof. Major, U. S. N., assisted chiefly by Mr. Ferguson, and Passed Midshipman Harrison.

EXPLANATION OF THE PRINTED OBSERVATIONS.

On the left-hand page :

Column 1 contains the date, the day being always supposed to commence with the transit of the Sun.

Column 2 contains the number for reference to the notes at the foot of the page.

Column 3 contains the designation of the object observed. Stars not belonging to the Nautical Almanac list are denoted in the order of preference, by their letter and constellation, their constellation and number in the catalogue of the British Association; the hour and number in Weisse's "Catalogus Stellarum, etc.;" the "Zone" of Bessel in which the star has been given, the number in the reduced Catalogue of Lalande, or finally by the term Anonymous.

Columns 4–10 contain the observed times of transit over the vertical wires of the diaphragm.

Column 11 shows the mean of the wires observed, the reduction to the mean of the seven, in the case of broken transits, being given in another place.

Columns 12–15 give the readings of the four microscopes, with the degrees and minutes shown by the first, or microscope A.

Column 16 contains the mean of the readings.

Column 17 contains the reading of the micrometer.

Columns 18–20 give the readings of the barometer, and attached and exterior thermometer, the former in inches, the two latter in degrees of Fahrenheit's scale.

Column 21 contains the initial of the observer's name: P denoting Lieut. D. D. Porter; M, Lieut. Maynard, and H, Prof. Hubbard.

On the right-hand page:

Column 1 is a repetition of column 2, on the preceding page.

Columns 2–3 contain the corrections to be applied to the circle-readings; the first for the instrument being the sum of the corrections for runs and for micrometer-reading; the second for the object, being the sum of the corrections for refraction, semi-diameter, parallax and reduction to the meridian.

Column 4 contains the readings thus corrected.

Column 5 gives the adopted Zenith Point, deduced from the readings at the extreme right of the page.

Columns 6–7 show the corrections to the mean of observed transits as given on the preceding page. The first, for the clock, is taken from the small table in the margin of the left-hand page, where it is given for a certain epoch at each date of observation, with the hourly rate. The second is the sum of the corrections for broken transits, for instrumental errors, and for semi-diameter; the latter being given separately in the small table in the margin of this page.

Columns 8–9 contain the observed apparent Æ and Dec.; the first obtained by adding the numbers in columns 6–7 of this page to the numbers in column 11 of the preceding, the second by subtracting the zenith point from the numbers in column 4 of this page, and adding the assumed latitude to the remainder.

Columns 10–11 contain the reductions of the stars to the mean equinox of 1850.0.

The last five columns contain the details of the determinations of the nadir point, giving with the date and hour, the circle-readings with the mean of each set.

The margin of the left-hand page contains, besides the quantities already explained, the notes entered in the observing books at the time of observation, and the corrections that have been applied to the circle-readings for defective illumination of the Moon's limb. There are also given here the times corresponding to micrometer observations of the Moon, of Polaris, or other objects observed at any distance from the middle transit-wire.

In the margin of the right-hand page are given the corrections in Æ for semi-diameter, the observed vertical semi-diameters, the adopted error of runs and the observed coincidences of mic. wire 4 with the fixed horizontal wire.

The mean places of the stars for 1850.0, obtained by adding the reductions to the apparent places have been collected together on pp. 379, 391. The arithmetical mean of the determinations here given, excluding a few cases where the numbers are enclosed in brackets, were then taken, and with the probable error where the observations were sufficiently numerous, inserted in the General Catalogue at the end of the volume. The apparent places of the Sun, Moon and Planets are collected on pp. 416–421, and compared with the tabular places as given by the Nautical Almanac. The quantity C — O is the excess of the computed over the observed place. The computed semi-diameters in Æ are the quantities used in the reductions, and already given in the margin of the printed observations.

THE PRIME VERTICAL TRANSIT INSTRUMENT.

This instrument has been fully described in the Preface to Vol. I., (pp. li–xc). The observations during the year 1846, were of the same nature as in the preceding year. A few changes were made in the adjustments and the diaphragm.

At the commencement of the year the error of azimuth amounted to one second of time, the south end of the axis being directed to the west of the meridian. In this position it was suffered to remain. But in the month of April, excavations were commenced at the southern extremity of the wing in which this instrument is placed, for the purpose of erecting a new pier for the reception of a great refraction circle. The effect of this excavation and of the erection of the pier was almost immediately manifested in a change of the position of the axis in azimuth, the error becoming a little less at first and then rapidly increasing, till on the 27th of April, it amounted to more than four seconds of time. No adjustment was attempted, however, in the still unsettled condition of things; the error remained nearly the same till the first of July, when it again increased and soon amounted to five seconds. This error was suffered to continue till the first of September, when it was reduced by adjustment to six-tenths of a second, the south end of the axis being now directed to the east of the meridian. In the course of the month it moved still further eastward, and was brought back by adjustment on the 7th of October. It continued to fluctuate within narrow limits during the remainder of the year, but no further adjustment was attempted. The values adopted in the reductions are given with the corresponding dates in the margin at the foot of the pages of printed observations.

The level-tube mentioned in the Introduction to Vol. I. (p. lvi,), was continued in use till Sept. 9, 1846, when it was found broken, probably by the expansive force of the ether under the high temperature of the season. This level tube was replaced by another of Ertel's manufacture, which however proved unfit for use from the irregularities of value of its divisions. It was employed only on three nights, viz: Sept. 9, 13 and 14. On the 16th the level-tube, by Pistor and Martins, belonging to the instrument was restored to its place and continued in use during the remainder of the year. The following are the adopted values of the divisions of these three tubes:

		″
Ertel, 1666	Jan. 1 to Sept. 9	1.05
Ertel,	Sept. 9 to Sept. 16	2.73
Pistor & Martins	Sept. 16 to Dec. 13	1.50

The disturbing causes mentioned above, which produced such great changes in the azimuth, affected the level but slightly. This error appeared to increase in April, and two adjustments are noted by the observer, on the 20th and 27th of this month. One or two other slight adjustments were made during the remainder of the year, but the fluctuations on the whole were not greater than have since occurred after the neighboring pier has become firmly settled. The level was read immediately before and after every observation over each vertical, and the resulting correction applied without reference to other determinations though on the same date. The amount of correction is given with the printed observations.

It may be here remarked, that the changes in the position of the bubble mentioned in p. lxxii, of the Introduction to Vol. I, have since been found by Prof. Hubbard, to originate in a faulty method of mounting the tube. One end of the socket containing the tube, rested upon the *steel* adjusting screws *f f*, Pl. IV, Vol. I, while the other end was supported by a *brass* frame. On removing the steel screws and substituting brass in their places, the inequality has entirely disappeared.

From the commencement of the year till March 27th, the temporary diaphragm mentioned in the Introduction to Vol. I, (p. liii,) was used. At the last mentioned date, the new diaphragm also mentioned above, and in the note at the foot of p. 272 in the observations of this year, was introduced. The system in each diaphragm consisted of 21 wires arranged as in fig. 2, plate iv. of Vol. I, and designated in the following manner: The "supplemental wires" nearest the pier are denoted by 1, 2, 3, commencing with the one farthest from the centre of the system, and counting from the pier; then follows the first set of seven, denoted by A. B. C. D. E. F. G., counting in the same direction. Next comes the middle wire, and then the same notation in the reverse order and with an accent on each letter and number designates the remaining ten wires, 1′ being the last, and farthest from the pier. The intervals of each wire from the middle were determined by Lieut. Herndon, in April, 1846. They are as follows:

	′	″		′	″
1	11	43.14	1′	11	40.25
2	10	3.13	2′	10	2.79
3	8	20.30	3′	8	19.09
A	6	50.85	A′	6	41.36
B	5	53.71	B′	5	52.02
C	5	0.58	C′	5	1.92
D	4	10.13	D′	4	10.65
E	3	19.98	E′	3	20.93
F	2	30.70	F′	2	30.75
G	1	39.00	G′	1	38.60

The readings of the micrometer scale increase as the micrometer wire is moved outwards from the pier. The value of one revolution of the micrometer screw was determined by Lieut. Herndon, by comparing the distance between G and G′, as given above, with the measurement of the same distance by the micrometer. He determined this value also by observing transits of stars near the zenith over the micrometer wire at intervals of a half revolution. The two first of the following results were obtained in the former way, the two last in the latter:

	″
Mar. 30	26.097
Sept. 19	26.252
Oct. 5	25.908
Oct. 11	26.005
Mean value	26.065

Through inadvertence, the value 26″.047 was adopted in the few reductions where this quantity is required; the error of the result is inappreciable.

The formulæ of reduction to apparent declinations are as follow:

Denoting by t and t' the observed times of transit in the E. over any given wire in the two positions of the instrument (N. and S.), and by $t_{\prime}'$ and t' the similar transits in the W., and making

$$s = \tfrac{1}{4} \left\{ (t_{\prime}' - t) + (t_{\prime} - t') \right\}$$

$$u = \tfrac{1}{4} \left\{ (t_{\prime}' - t) - (t_{\prime} - t') \right\}$$

and denoting moreover by δ and $(\phi + b)$ the declination and the sum of the latitude and level-correction; then

$$\tan \delta = \tan (\phi + b) \, . \cos s . \cos u.$$

The computation is performed independently for each wire, and the mean of the results given in the pages of the printed observations.

The time of the star's meridian passage is easily found, by taking the half sum of corresponding transits in the prime vertical. In a complete observation there are seven of these determinations with telescope N, and seven with telescope S. The mean is entered in the pages of printed observations. If the level indicate a change of position of the axis in the interval between the E. and W. transits, a correction is applied to this mean, computed by the formula—

$$d\,\mathrm{T} = \frac{\mathrm{I_E} - \mathrm{I_W}}{30 \sqrt{(\sin(\phi + \delta) \, . \sin(\phi - \delta))}} \; . \sin \delta . \operatorname{cosec} \phi$$

The clock-correction being now also applied to the mean of wires, the error of the axis in azimuth is obtained by comparing this corrected time with the tabular Æ of the star.

A few observations of stars very near the zenith were made in 1846, with the micrometer. These have been reduced in the following manner:

We have

$$\delta = \phi + b - \mathrm{C} + m - \text{Red. to vertical} + \text{coll}^{\text{n}}. \;\text{(Tel S.)}$$
$$= \phi + b + \mathrm{C} - m - \text{Red. to vertical} - \text{coll}^{\text{n}}. \;\text{(Tel. N.)}$$

where, besides the symbols already used, C denotes the micrometer reading at coincidence with the middle wire, and m, the micrometer reading for the star.

The reduction to the vertical is given in parts of a revolution of the mic. screw by the formula

$$m.\ k.\ \sin^2 \tfrac{1}{2}\, t.$$

where $m = 1^r = 26''.065$

$k = [5.6154551].\ \cos \delta.\ \sin \phi.$

$t =$ hour angle.

The apparent Æ and Decl. have been reduced to the mean equinox and obliquity of 1850.0., by help of the "Independent Constants" in the same manner as described above for the Meridian Circle.

The computations were entirely performed by Lieut. Herndon, with the exception of the reductions to mean places, which were computed by Mr. J. Johnson Pettigrew, of North Carolina.

EXPLANATION OF THE PRINTED OBSERVATIONS.

On the left hand page:

Column 1 contains the date, the day always commencing with the transit of the Sun, and the date being that of the meridian passage of the star.

Column 2 contains the reference number for the notes.

Column 3 contains the designation of the objects observed, the names being given in the order of preference from the Nautical Almanac, the Catalogue of the British Association or the Zones of Bessel.

Column 4 indicates the vertical (E. or W.) in which the observation was made, the order being always E. W.

Columns 5 and 13 show the position of the Telescope with reference to the pier, the instrument being always reversed between the transits given in columns 12 and 14.

Columns 6 . . . 20 contain the recorded times of transit over the vertical wires. When, as often happens with this instrument, any wires have been omitted or lost in either of the four sets of transits, the three corresponding observations have been suppressed as of no value.

On the right hand page:

Column 1 is a repetition of column 2 of the preceding page.

Columns 2 and 3 contain the means of four readings of the level in the two positions of the Telescope, (N. and S.)

Column 4 shows the excess of the numbers in column 3 over those in column 2.

Column 5 contains the mean of the two numbers in column 4, multiplied by the value of one division of the level. These quantities have been added to the assumed latitude in computing the declinations.

Column 6 contains the mean of observed transits, the first reading of wire A. in the E. being combined with the last of the same wire in the W., and similarly with the other wires. In a complete observation, therefore, the quantities in this column are the means of 14 observations.

Columns 7 and 8 contain the corrections to be applied to the quantities just mentioned; the first, for the clock, obtained by chronometer comparisons with the west sidereal clock; and the second being the sum of the constant correction for azimuth and a small correction depending upon the difference of the numbers in column 4, or the change of level between the transits E. and W.

Columns 9 and 10 give the apparent Æ. and Dec., the former obtained by adding together the numbers in columns 6, 7 and 8: the latter computed from the intervals of transit in the manner described in the Introduction to Vol. I, p. lxxix.

Columns 11 and 12 contain the reductions to the mean equinox and ecliptic of 1850.0.

Column 13 gives the initial of the observers name, M. denoting Lieut. Maury, H. Lieut. Herndon, and W. Passed Midshipman Worden.

Column 14 gives the magnitude of the star.

Column 15 is a repetition of column 3 of the preceding page.

In the margin at the foot of the left hand page are given the values of the azimuth error, and of the clock's hourly rate, for each date of observation. In some cases stars have been observed over the supplemental wires, and these observations are given also in the margin, having been always combined in reduction with those in the page above. The notes entered in the observing book are also given in the margins, and the assumed latitude of the instrument is repeated at the foot of each right hand page.

The mean Æ. and Dec. of all the stars observed, have been collected together in pp. 394 . . . . 401, and the mean results for each star, with their probable errors, embodied in the General Catalogue at the end of the volume.

THE EQUATORIAL INSTRUMENT.

The Equatorial Instrument, by Merz and Mahler, is represented in Plate XI, Vol. I, and, in dimensions and plan of construction is the counterpart of the instruments at Dorpat and Berlin. The object-glass has a clear aperture of 9.65 inches, and a focal length of 14 feet 4.3 inches.

The following determinations of the value of one revolution of the micrometer-screw, were made in 1845-'46.

				″
1845.	May	8,	Polaris	15.425—Prof. Coffin.
1846.	Jan.	18,	Comes Polaris	15.292—Prof. Coffin.
	Feb.	13,	α Lyræ	15.399—Mr. Walker.
		13,	Polaris	15.428—Mr. Walker.
	Mar.	8,	Polaris	15.400—Mr. Walker.
		11,	Polaris	15.465—Mr. Walker.
	Oct.	29,	Polaris	15.403—Lieut. D. D. Porter.
	Nov.	9,	Polaris	15.434—Lieut. D. D. Porter.

The value adopted for 1845-'46 is 15″.406.

The following change was made in the micrometer diaphragm in 1846. After the observations of March 22, three fixed transit wires, whose intervals were nearly equal to 12 revolutions of the micrometer-screw, were inserted with three wires at right-angles to these, and with intervals of about 30 revolutions. The transit-wires are denoted by I, II, III, I being nearest to the vernier marked II on the position circle of the micrometer. The equatorial intervals are, as determined by Mr. Walker:

II—I.	III—II.
s.	s.
12.378.	12.364.

The micrometer-wires are designated as 1. 2. 3. 1 being nearest the micrometer head; and the intervals between these wires are:

		2—1.	3—2.	3—1.
		r.	r.	r.
At Transit wire	I.	30.007	30.022	60.029.
	II.	29.987	29.983	59.970.
	III.	29.959	29.941	59.900.

The observations with the new diaphragm commenced on March 30, 1846.

As no observer was regularly attached to this instrument, till near the close of 1846,[*] the observations have been, with the exception of those on Biela's Comet, casual, and such as could be conveniently taken by those having other instruments in charge. Nearly all the observations of Biela's Comet, and of Neptune, were made by Lieut. Maury. The reductions were performed at the time, by Prof's Coffin and Hubbard, and Mr. Walker, and the final reductions and preparation for the press, by Mr. Ferguson, assisted by Prof. Hubbard.

EXPLANATION OF THE PRINTED OBSERVATIONS.

In the observations previous to March 30:

Column 1 contains the name of the object observed.

Column 2, the chronometer times of transit over the vertical wire of the diaphragm.

Column 3, the reading of the micrometer.

Column 4, the differences of the numbers in column 2.

Column 5, the differences of the numbers in column 3.

Column 6, the initial of the observer's name.

At the foot of the observations on each date, are given the correction of the chronometer, obtained by direct comparison with the west sidereal clock; the assumed apparent places, for the date, of the stars of comparison; the means of the quantities in columns 5 and 6, the latter expressed in minutes and seconds, with the mean of the corresponding times corrected for the chronometer error, and finally the correction to be applied to the $\Delta\alpha$ and $\Delta\delta$ on account of the difference of refraction. A few unreduced observations of position and distance are also given. In the observations subsequent to March 30, separate columns have been assigned to the transit-wires, and a column introduced containing the mean of the three transits. The results have been collected at the side of the observations, as a matter of convenience in printing.

During the Solar Eclipse of April 24-5, 1846, an attempt was made to obtain a series of observations of the solar cusps, but the frequent interruptions by clouds and other circumstances, prevented a satisfactory result. No complete discussion was made of the observations, but they are given in connexion with a few determinations of the diameters of the Sun and Moon, on pp. 357-358. A few occultations observed in 1846, and the observed times of commencement of the Solar Eclipse are given on p. 359.

The results of the observations of comets and of Neptune are collected on pp. 422–425, with the Washington mean time corresponding to each result, and the adopted mean place for 1850.0 of the stars of comparison.

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[*] Mr. Walker, though formally in charge of the instrument, was chiefly engaged during the year in computations.

OBSERVATIONS

WITH THE

WEST TRANSIT INSTRUMENT,

1846.

NATIONAL OBSERVATORY.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.		
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.
Jan. 2	†1	Sun, 2d L.	8.2	24.0	40.1	55.5	11.4	27.2	43.0	18 53 55.63	+ 0 0.18	− 70.94	− 30.64	18 53 25.07	. .
3	2	Sun, 1st L. . . .	10.3	26.1	41.8	57.1	13.5	29.0	45.0	18 55 57.54	.18	} . .	.17	18 56 38.55	. .
	3	Sun, 2d L.	32.3	48.0	3.6	19.4	35.5	51.1	6.9	18 58 19.54	.18				. .
	4	Moon, 1st L. . . .	56.4	11.2	26.2	41.0	56.1	10.9	25.7	0 12 41.07	.26	+ 65.76	.05	0 22 11.28	. .
	†5	Herschel	37.9	52.2	6.8	21.1	35.8	49.6	4.5	0 25 21.13	.25	. .	.04	0 15 51.34	. .
	6	Jupiter, 1st L. . . .	46.7	1.4	16.0	31.1	45.8	0.3	15.2	1 57 30.93	.28	1.47	.02	1 57 1.28	. .
	7	Andromedæ, (661) .	9.5	27.5	46.3	5.0	23.0	41.1	0.0	2 2 4.63	.42	. . .	.00	2 1 35.05	+ 12.61
4	8	α Andromedæ . . .	7.0	23.4	39.9	56.2	12.8	29.2	45.5	0 0 56.29	.36	. . .	− 29.56	0 0 27.09	11.63
	9	Herschel	41.1	55.2	9.9	24.2	39.1	53.1	7.9	0 25 24.36	.25	. . .	.56	0 24 55.05	. .
	10	α Cassiopeiæ	1.2	27.0	53.0	18.4	44.3	9.8	35.8	0 32 18.50	.61	. . .	.55	0 31 49.56	12.05
	11	δ Piscium	28.2	42.8	57.2	12.0	26.6	40.9	55.4	0 41 11.87	.23	. . .	.55	0 40 42.55	11.63
	12	Polaris	56.5	8.0	21.5	30.0	48.0	56.5	14.0	1 4 33.50	11.92	. . .	.54	1 4 15.98	45.03
	13	Moon, 1st L. . . .	35.3	50.1	5.1	19.9	35.4	50.4	5.1	1 5 20.28	0.28	65.40	.54	1 4 50.92	. .
	14	ϑ¹ Ceti	5.9	20.5	35.0	49.8	4.6	19.1	33.6	1 16 49.79	.22	. . .	.54	1 16 20.47	11.15
	15	ε Cassiopeiæ	18.3	50.1	22.2	53.9	26.0	57.2	29.5	1 43 53.89	.75	. . .	.53	1 43 25.11	14.28
	16	Jupiter, 1st L. . .	53.1	7.8	22.6	37.3	52.2	6.9	21.7	1 57 37.37	.22	1.47	.52	1 57 8.13	. .
	17	Andromedæ, (661) .	8.9	27.3	46.9	4.4	23.0	41.2	59.9	2 2 4.39	.43	. . .	.52	2 1 35.30	12.62
	18	Cassiopeiæ, (744) .	9.6	46.1	22.9	59.4	36.5	12.6	49.0	2 16 59.44	.86	. . .	.52	2 16 30.78	15.86
	19	γ Ceti	6.6	21.1	35.5	50.0	4.8	19.1	33.5	2 35 50.09	.24	. . .	.51	2 35 20.81	10.99
5	20	α Lyræ	15.6	34.4	53.2	11.7	30.0	48.5	7.0	18 32 11.49	.43	. . .	.54	18 31 42.38	9.26
	21	Venus, 1st L. . . .	12.6	27.5	42.3	56.8	11.9	26.7	41.6	22 14 57.06	.21	1.00	.46	22 14 27.81	. .
	22	Arietis, (741) . . .	3.7	18.2	32.8	47.6	2.3	16.7	31.5	2 16 47.54	+ 0 0.28	. . .	.34	2 16 18.48	11.38
	23	γ Ceti	..	..	35.5	49.8	4.7	19.0	33.4	2 36 4.50	− 0 14.26	. . .	.33	2 35 20.91	11.00
	24	α Ceti	..	..	30.1	44.6	59.1	13.8	28.0	2 54 59.12	14.28	. . .	.33	2 54 15.51	10.99
	25	α Tauri	..	..	..	36.4	51.5	6.7	21.7	4 27 59.07	22.34	. . .	.32	4 27 7.41	11.65
	26	α Aurigæ	..	9.2	30.2	51.0	11.8	32.5	53.3	5 9 1.33	− 0 9.91	. . .	.31	5 5 22.11	14.68
	27	β Tauri	15.5	31.9	48.4	4.8	21.8	38.0	54.5	5 17 4.99	+ 0 0.36	. . .	.31	5 16 36.04	12.72
	28	α Leporis	41.8	56.8	12.2	27.4	42.8	58.0	13.2	5 26 27.46	.19	. . .	.30	5 25 58.35	8.61
	29	ε Orionis	11.6	26.0	40.7	55.1	9.8	24.1	38.7	5 28 55.14	.24	. . .	.30	5 28 26.08	10.11
	30	α Columbæ	43.0	0.4	18.0	35.5	53.3	10.8	28.1	5 34 35.59	.15	. . .	.30	5 34 6.44	6.64
	31	α Orionis	37.3	52.0	6.7	21.6	36.6	50.5	5.1	5 47 21.33	.22	. . .	.30	5 46 52.25	10.84
	32	μ Geminorum . . .	22.8	38.4	54.2	9.9	25.8	41.3	56.9	6 14 9.90	+ 0 0.33	. . .	.29	6 13 40.94	12.15
	33	α Canis Majoris . . .	..	..	..	..	8.3	23.3	38.3	6 39 23.30	− 0 30.07	. . .	.29	6 38 23.94	8.44
8	34	Venus, 1st L. . . .	26.2	40.9	55.9	10.3	25.2	40.0	54.8	22 24 10.47	+ 0 0.22	1.04	− 28.02	22 23 42.67	. .
	35	ϑ¹ Ceti	4.3	18.9	33.7	48.1	3.0	17.2	32.2	1 16 48.20	.22	. . .	.00	1 16 20.42	11.20
	36	ε Cassiopeiæ	17.0	48.7	20.7	52.1	24.7	56.1	28.0	1 43 52.47	.78	. . .	.00	1 43 25.25	14.43
	37	Jupiter, 1st L. . . .	26.9	41.7	56.5	11.3	26.0	40.8	55.5	1 58 11.24	.18	1.44	− 27.99	1 57 43.43	. .
	38	Cassiopeiæ, (744) . .	8.0	44.8	21.7	57.7	34.9	11.2	47.9	2 16 58.03	.84	. . .	.99	2 16 30.88	16.02
	39	γ Ceti	5.1	19.7	34.1	48.7	3.1	17.6	32.1	2 35 48.63	.25	. . .	.99	2 35 20.89	11.04
	40	α Ceti	59.8	14.3	28.9	43.1	57.9	12.4	26.9	2 54 43.33	.26	. . .	.99	2 54 15.66	11.03
	41	α Persei	45.0	7.0	29.3	51.4	14.0	36.0	58.2	3 13 51.56	.52	. . .	.98	3 13 24.10	14.34
	42	η Tauri	2.6	18.2	34.1	50.0	6.0	21.9	37.5	3 38 50.04	.34	. . .	.97	3 38 22.41	12.21
	43	A¹ Tauri	19.0	34.5	50.3	5.8	21.7	37.5	53.3	3 56 6.01	.33	. . .	.97	3 55 38.37	12.09
	†44	Vesta	50.3	5.1	20.6	35.8	51.0	6.0	21.0	4 4 35.69	.31	. . .	.96	4 4 8.04	. .
	45	Moon, 1st L. . . .	29.7	45.5	1.2	16.8	32.8	48.1	3.4	4 36 16.86	.32	65.68	.96	4 35 49.22	. .
	46	ι Tauri	37.0	52.3	8.0	23.5	29.2	54.5	10.2	4 54 23.53	.33	. . .	.96	4 53 55.90	12.09
	47	Orionis, (1591). . .	38.1	53.0	8.1	23.1	38.2	53.1	8.1	5 1 23.10	.30	. . .	.95	5 0 55.15	11.55
	48	β Orionis	54.1	8.3	23.3	37.8	52.7	7.1	22.1	5 7 37.91	.22	. . .	.95	5 7 10.18	9.58
	49	β Tauri	14.1	30.6	47.2	3.6	20.1	36.7	53.3	5 17 3.66	.36	. . .	.95	5 16 36.07	12.71
10	†50	Polaris	26.0	6.0	45.0	24.0	3.0	41.0	20.0	1 4 23.57	14.17	. . .	.92	1 4 9.82	49.21
	51	Jupiter, 1st L. . . .	49.3	3.9	18.8	33.6	48.4	2.9	17.8	1 58 33.53	0.18	+ 1.44	.92	1 58 5.79	. .
	52	γ Ceti	4.8	19.5	34.0	48.2	3.2	17.7	32.2	2 35 48.51	+ 0 0.25	. . .	− 27.91	2 35 20.85	+ 11.05

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 1h.	0s.
	s.	s.	s.	s.	
Jan. 2	+0.118	+0.181	+0.129	f 30.54	l .021
" 3	.118	.181	.129	30.04	.021
" 4	.118	.181	.129	29.54	.021
" 5	.118	.181	.129	29.36	.014
" 8	.118	.181	.129	27.93	g .013
" 10	.118	.181	.129	27.92	l .007

*A. Lt. Almy.
*K. Prof. Keith.
1. Passing clouds.
5. Hazy to-night, and observations imperfect.
44. A very small star in the field precedes Vesta.
50. Observed over micrometer wire at ½ revs.

TE. 46.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
10	1	α Ceti	..	..	..	..	..	12.1	26.7	2 55 19.40	— 0 36.04	. . .	— 27.92	2 54 15.44	+ 11.05	K.
	2	α Persei	44.8	6.7	29.2	51.0	13.7	5.6	57.8	3 13 51.26	+ 0 0.53	. . .	.91	3 13 23.88	14.38	
	3	η Tauri	2.4	18.1	34.0	49.8	5.8	21.5	37.4	3 38 49.86	+ 0 0.36	. . .	.91	3 38 22.31	12.23	
	4	Tauri, (1176)	..	..	14.5	30.3	46.2	2.0	18.2	3 40 46.24	— 0 15.49	. . .	.91	3 40 2.84	12.23	
	5	γ^1 Eridani	..	..	..	20.1	35.1	49.0	4.8	3 51 42.47	— 0 22.21	. . .	.91	3 50 52.35	9.59	
	6	Vesta	11.2	26.3	41.6	56.6	12.0	26.9	42.0	4 3 56.66	+ 0 0.31	. . .	.91	4 3 29.06	. .	
	7	α Tauri	49.6	4.7	19.8	34.9	50.2	5.3	20.1	4 27 34.94	.31	. . .	.90	4 27 7.35	11.67	
	8	β Orionis	54.0	8.7	23.3	38.0	52.8	7.3	22.0	5 7 38.01	.22	. . .	.90	5 7 10.33	9.60	
	9	α Leporis	40.4	55.4	10.9	25.8	41.7	56.6	11.9	5 26 26.10	+ 0 0.19	. . .	.90	5 25 58.39	8.62	
	10	ε Orionis	..	..	39.1	53.5	8.2	22.9	37.3	5 29 8.20	— 0 14.27	. . .	.90	5 28 26.03	10.12	
	11	α Columbæ	41.2	59.1	16.8	34.0	51.9	9.0	26.8	5 34 34.11	+ 0 0.15	. . .	.90	5 34 6.36	6.66	
	12	α Orionis	35.9	50.8	5.4	19.8	34.7	49.1	3.9	5 47 19.94	.27	. . .	.89	5 46 52.32	10.82	
	13	μ Geminorum	21.3	36.9	52.8	8.3	24.5	39.8	55.7	6 14 8.47	.33	. . .	.89	6 13 40.91	12.13	
	14	Moon, 1st L.	57.6	13.3	29.0	44.5	0.4	15.8	31.6	6 22 44.60	.32	+ 64.78	.89	6 22 17.03	. .	
	15	α Canis Majoris	6.3	21.3	36.7	51.8	6.8	22.0	37.0	6 38 51.70	.20	. . .	.89	6 38 24.01	8.42	
12	16	Cassiopeiæ, (744)	6.9	43.6	20.0	56.4	33.8	10.0	46.8	2 16 56.79	.85	. . .	.21	2 16 30.43	16.18	A.
	17	γ Ceti	4.5	18.9	33.3	47.9	2.4	17.0	31.6	2 35 47.94	.25	. . .	.21	2 35 20.98	11.07	
	18	β Persei	42.0	1.0	20.0	38.9	58.2	17.1	36.1	2 58 39.04	.44	. . .	.21	2 58 12.27	13.36	
	19	α Persei	43.8	6.1	28.2	50.1	13.1	35.1	57.1	3 13 50.50	.53	. . .	.20	2 13 23.83	14.41	
	†20	Tauri, (1161)	53.1	8.8	24.9	40.1	56.1	11.8	27.9	3 37 40.39	.34	. . .	.20	3 37 13.53	12.24	
	21	γ^1 Eridani	34.6	49.3	4.2	19.1	34.4	49.1	4.1	3 51 19.26	.21	. . .	.20	3 50 52.27	9.61	
	22	Vesta	39.0	53.6	9.2	24.1	39.2	54.3	9.9	4 3 24.19	.31	. . .	.20	4 2 57.30	. .	
	23	Eridani, (1433)	12.1	29.0	46.0	2.6	19.8	36.4	53.1	4 30 2.71	.37	. . .	.20	4 29 35.88	7.63	
	24	α Aurigæ	46.1	7.0	28.1	48.7	9.8	30.6	51.2	5 5 48.79	.49	. . .	.20	5 5 22.08	14.71	
	25	δ Orionis	54.0	8.2	22.8	37.4	52.0	6.4	20.9	5 24 37.39	.25	. . .	.20	5 24 10.44	10.22	
	26	ζ Orionis	44.9	59.2	13.9	28.2	42.8	57.3	11.9	5 33 28.31	.24	. . .	.19	5 33 1.36	10.06	
	27	δ Aurigæ	6.2	31.1	55.9	20.7	45.9	10.4	35.0	5 47 20.74	.59	. . .	.19	5 46 54.14	16.19	
	†28	δ Geminorum	37.4	53.0	8.9	24.2	40.2	..	..	7 11 8.74	15.99	. . .	.19	7 10 57.54	11.96	
	29	Geminorum, (2486)	33.0	47.9	3.0	17.9	33.2	47.9	..	7 25 10.48	7.84	. . .	.19	7 24 51.13	11.39	
	30	Geminorum, (2519)	18.1	33.3	48.6	3.9	19.3	34.4	49.7	7 31 3.90	0.31	. . .	.18	7 30 37.03	11.56	
13	31	Sun, 1st L.	46.3	1.7	17.5	32.9	48.9	4.3	19.9	19 39 33.07	.33	} . . .	.63	19 40 15.93	. .	K.
	32	Sun, 2d L.	6.6	22.0	37.7	53.3	9.2	24.6	40.3	19 41 53.39	.33					
	33	Venus, 1st L.	31.9	46.6	1.4	15.9	30.8	45.3	59.9	22 38 15.97	+ 0 0.22	+ 1.10	.57	22 37 48.62	. .	
	34	α Cassiopeiæ	..	..	..	15.8	41.6	7.1	33.0	0 32 54.37	— 0 37.97	. . .	.53	0 31 48.87	12.32	
	†35	Polaris	25.0	4.0	43.0	22.0	3.0	40.0	16.0	1 4 21.86	+ 0 14.17	. . .	.51	1 4 8.52	51.74	
	36	ϑ^1 Ceti	3.7	18.0	33.0	47.7	2.5	17.1	31.7	1 16 47.67	0.22	. . .	.51	1 16 20.38	11.26	
	37	Jupiter, 1st L.	27.2	42.4	57.0	11.8	26.8	41.5	56.3	1 59 11.86	.23	+ 1.42	.50	1 58 44.59	. .	
	38	α Ceti	58.9	13.5	27.9	42.5	57.3	11.6	26.2	2 54 42.56	.26	. . .	.49	2 54 15.33	11.08	
	39	α Persei	44.1	6.2	28.4	50.7	13.5	35.1	57.3	3 13 50.76	+ 0 0.53	. . .	.47	3 13 23.82	14.43	
	40	η Tauri	..	17.6	33.0	49.0	5.2	21.0	36.7	3 38 57.08	— 0 7.56	. . .	.47	3 38 22.05	12.26	
	41	Tauri, (1176)	..	..	13.8	29.5	45.7	1.3	17.6	3 41 45.58	— 0 15.49	. . .	.47	3 41 2.63	12.26	
	42	γ^1 Eridani	34.8	49.9	4.7	19.8	34.6	49.6	4.4	3 51 19.69	+ 0 0.21	. . .	.46	3 50 52.44	9.62	
	43	Vesta	..	..	..	11.3	26.8	41.8	57.0	4 3 34.22	— 0 22.38	. . .	.45	4 2 44.39	. .	
	44	α Leporis	39.7	54.8	10.3	25.6	40.8	55.8	11.0	5 26 25.40	+ 0 0.20	. . .	.43	5 25 58.17	8.63	
	45	ε Orionis	..	..	38.8	53.0	7.9	22.3	36.6	5 29 7.72	— 0 14.20	. . .	.43	5 28 26.03	10.12	
	46	α Columbæ	..	58.6	16.3	33.8	51.4	8.7	26.2	5 34 42.50	— 0 8.61	. . .	.42	5 34 6.47	6.68	
	47	α Orionis	35.5	50.0	4.8	19.2	34.2	48.7	3.4	5 47 19.40	+ 0 0.27	. . .	.42	5 46 52.25	10.82	
	48	α Canis Majoris	5.8	20.7	36.0	51.0	6.6	..	..	6 38 36.02	+ 0 15.31	. . .	.41	6 38 23.92	8.41	
	49	ε Canis Majoris	..	..	47.6	4.2	20.8	37.0	53.7	6 53 20.66	— 0 16.38	. . .	.41	6 52 36.87	7.18	
	50	δ Geminorum	37.9	53.5	9.2	24.7	40.6	56.0	11.7	7 11 24.80	+ 0 0.33	. . .	.39	7 10 57.74	11.96	
	51	α^1 Geminorum	..	40.8	..	15.0	..	49.2	..	7 25 15.04	.38	. . .	.39	7 24 48.03	12.77	
	52	α^2 Geminorum	24.0	..	58.3	..	32.9	..	6.8	7 25 15.47	+ 0 0.38	. . .	— 27.39	7 24 48.46	+ 12.77	

20. Doubtful as to the right star.
28. Clouds passing after the 5th wire.
35. Observed over micrometer wire at ½ revs.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 1h.	0s.
	s.	s.	s.	s.	
Jan. 10	+0.118	+0.181	+0.129	f 27.92	l .007
" 12	.118	.181	.129	27.21	.003
" 13	.118	.181	.129	27.51	.021

	TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
								Means.	Inst.	Semi-diam.	Clock.			
						s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
						12.7	27.2	7 31 43.59	+ 0 0.27	. . .	— 27.29	7 31 16.47	+ 10.33	K.
						10.0	26.0	7 36 2.02	— 0 23.60	. . .	.38	7 35 11.04	12.09	
					44.9	0.6	16.0	8 1 28.69	+ 0 0.18	. . .	.37	8 1 1.50	7.93	
					33.3	48.2	3.6	8 22 17.79	.32	. . .	.37	8 21 50.74	11.46	
					40.3	55.4	10.7	8 36 24.77	.32	. . .	.36	8 35 57.73	11.44	
					21.0	35.3	50.1	8 39 6.27	.27	. . .	.36	8 38 39.18	10.58	
					9.7	24.5	..	8 53 54.52	.29	— 62.23	.36	8 53 27.45	. .	
					8.2	22.9	37.7	8 59 53.33	.29	. . .	.35	8 59 26.27	10.88	
				30.4	45.2	58.8	14.3	9 20 30.34	.22	. . .	.35	9 20 3.21	9.70	
				7.4	22.3	37.2	51.9	9 24 7.47	.29	. . .	.34	9 23 40.42	10.92	
				8.7	27.5	45.9	4.4	18 32 8.76	.42	. . .	26.81	18 31 42.37	9.14	A.
				50.8	6.5	22.1	37.8	19 43 50.91	.18	. . .	.71	19 44 34.51	. .	
			55.5	11.2	27.0	42.4	57.9	19 46 11.17	.18					
			37.2	51.9	6.7	21.0	35.8	22 40 51.87	.22	+ 1.11	.67	22 40 25.42	. .	
			49.5	15.1	41.0	6.6	32.3	0 32 15.17	.61	. . .	.65	0 31 49.13	12.35	
			3.0	18.2	33.8	48.9	4.1	0 36 18.26	.19	. . .	.65	0 35 51.80	11.68	
			51.7	6.2	21.1	35.7	50.1	0 55 6.34	.23	. . .	.64	0 54 39.93	. .	
		[illegible]	42.5	19.0	57.5	36.0	14.5	1 4 20.07	11.92	. . .	.64	1 4 5.35	52.61	
	[illegible]	17.3	32.1	46.8	1.4	16.0	30.8	1 16 46.77	0.22	. . .	.64	1 16 20.35	11.27	
			18.9	50.5	22.5	54.1	26.1	1 43 50.57	.76	. . .	.63	1 43 24.70	14.65	
	[illegible]	56.1	10.8	25.4	40.3	55.1	9.8	1 59 25.53	.28	+ 1.41	.63	1 58 59.18	. .	
	[illegible]	42.8	19.5	55.9	33.0	9.3	45.9	2 16 56.09	.87	. . .	.63	2 16 30.33	16.26	
	3.8	18.1	32.9	47.0	2.0	16.1	30.9	2 35 47.26	.26	. . .	.63	2 35 20.89	11.10	
	58.1	12.8	27.1	41.8	56.1	10.9	25.4	2 54 41.74	.26	. . .	.62	2 54 15.38	11.09	
	1.2	17.0	32.9	48.6	4.7	20.1	36.0	3 38 48.64	.34	. . .	.62	3 38 22.36	12.27	
	34.0	48.9	3.9	18.5	33.8	48.5	3.6	3 51 18.74	.21	. . .	.61	3 50 52.34	9.64	
	14.1	29.0	44.5	59.3	14.8	29.8	45.0	4 2 59.50	.31	. . .	.61	4 2 33.20	. .	
	48.1	3.4	18.2	33.4	48.8	3.5	18.7	4 27 33.44	+ 0 0.31	. . .	.60	4 27 7.15	+ 11.70	
S. P.	51.0	39.3	26.5	14.7	3.0	51.0	38.2	5 2 14.81	— 0 2.10	. . .	.60	5 1 46.11	— 15.37	
	12.6	29.1	45.8	2.1	19.0	35.1	51.7	5 17 2.20	+ 0 0.36	. . .	.60	5 16 35.96	+ 12.75	
	39.0	54.1	9.4	24.6	40.1	55.1	10.3	5 26 24.66	.19	. . .	.60	5 25 58.25	8.64	
	44.2	58.7	13.2	27.6	42.4	56.6	11.1	5 33 27.69	.24	. . .	.59	5 33 1.34	10.06	
	34.8	49.1	4.0	18.3	33.2	47.8	2.4	5 47 18.51	+ 0 0.22	. . .	.59	5 46 52.14	+ 10.82	
S. P.	53.0	57.0	..	6.0	..	14.0	16.0	6 22 5.50	— 0 5.39	. . .	.59	6 21 33.52	— 50.63	
	17.0	18.5	..	26.0	..	32.0	35.0	6 27 25.70	+ 0 7.01	. . .	.58	6 27 6.53	+ 88.08	
	23.2	40.3	57.4	14.6	31.8	49.0	6.1	7 25 14.63	0 0.38	. . .	.58	7 24 48.43	12.76	
Minoris	59.0	13.4	28.1	42.6	57.1	11.9	26.2	7 31 42.61	.27	. . .	.57	7 31 16.31	10.32	
	32.2	48.6	5.1	21.7	38.3	54.6	11.1	7 36 21.66	.36	. . .	.56	7 35 55.46	12.22	
	40.3	56.1	11.9	27.8	43.9	59.3	15.2	8 1 27.79	.18	. . .	.56	8 1 1.41	7.92	
Majoris	28.5	2.6	37.0	10.8	45.1	19.3	53.1	8 27 10.91	.81	. . .	.55	8 26 45.17	17.46	
Hydræ	21.8	36.1	50.7	5.2	20.0	34.5	49.0	8 39 5.33	.27	. . .	.55	8 38 39.05	10.56	
Majoris	1.1	23.0	44.9	6.8	29.0	50.9	12.6	8 49 6.90	.51	. . .	.54	8 48 40.87	13.81	
Cancri	8.0	22.8	37.5	52.1	7.2	22.0	36.8	8 59 52.34	.29	. . .	.54	8 59 26.09	10.90	
Cephei, S. P.	46.3	17.7	47.9	19.2	50.2	20.9	51.3	9 15 19.07	.73	. . .	.54	9 14 53.26	7.23	
Leonis	22.2	36.9	51.9	6.5	21.5	36.0	51.0	9 24 6.57	.29	. . .	.54	9 23 40.32	10.89	
Moon, 2d L.	38.9	53.8	8.7	23.6	38.7	53.4	8.5	9 41 23.66	.28	— 61.64	.53	9 40 57.41	. .	
Leonis	48.4	2.8	17.5	32.1	47.0	1.7	16.1	9 52 32.23	.28	. . .	.53	9 52 5.98	10.75	
Leonis	53.2	8.0	23.0	37.9	53.0	7.5	22.7	10 0 37.90	.29	. . .	.52	10 0 11.67	+ 10.88	
Sun, 1st L.	22.3	37.9	53.5	8.8	24.7	40.3	55.8	19 48 9.04	.18	. . .	.65	19 48 52.52	. .	E
Sun, 2d L.	42.3	57.7	13.3	29.0	44.7	0.0	15.5	19 50 28.94	.18					
Sun, 1st L.	26.6	42.0	57.5	12.9	28.7	44.0	59.3	20 5 13.00	.18	. . .	— 25.67	20 5 57.15	. .	
Sun, 2d L.	45.8	1.2	16.7	32.1	48.0	3.4	18.8	20 7 32.28	+ 0 0.18					

	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 1h.	0s.
	s.	s.	s.	s.	
Jan. 13	+0.118	+0.181	+0.129	f 27.51	l .021
" 14	.118	.181	.129	26 64	.013
" 15	.118	.181	.129	26.69	.013
" 19	.118	.181	.129	25.52	.032

11, +0s.36 applied to correction for clock on account of personal equation.
17. Observed the centre of Mars.
18. Observed Polaris over the micrometer wire at ½ revs.

TE 46.	No. for ref.		OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
				s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	S.	S.	H. M. S.	S.	
19	1		Venus, 1st L.	59.8	14.2	28.7	43.2	58.1	12.6	27.0	22 52 43.37	+ 0 0.23	+ 1.20	— 25.61	22 52 19.19	. .	K.
	2	γ	Ceti	..	17.0	31.6	45.8	0.7	15.1	..	2 35 46.04	.25	. .	.49	2 35 20.80	+ 11.16	
	3	α	Ceti	..	11.7	26.2	40.5	55.3	9.7	..	2 54 40.68	.26	. .	.48	2 54 15.46	11.15	
	4	η	Tauri	20.0	15.8	31.6	47.4	3.2	18.8	34.8	3 38 47.37	+ 0 0.34	. .	.46	3 38 22.25	12.33	
	5		Tauri, (1176)	..	56.0	11.8	27.7	43.8	59.4	15.3	3 40 35.67	— 0 7,58	. .	.45	3 40 2.64	12.32	
	6	γ^1	Eridani	32.7	47.7	2.6	17.5	32.7	47.7	2.4	3 51 17.61	+ 0 0.21	. .	.44	3 50 52.41	9.70	
	7		Vesta	44.2	59.0	14.0	29.2	44.6	59.7	14.7	4 2 29.34	.31	. .	.43	4 2 4.22	. .	
	8	α	Tauri	47.1	2.0	17.4	32.3	47.5	2.3	17.3	4 27 32.27	+ 0 0.31	. .	.42	4 27 7.16	11.74	
	9	β	Tauri	..	..	44.3	1.1	17.7	34.0	50.5	5 17 17.52	— 0 16.13	. .	.40	5 16 35.99	12.75	
	10	α	Leporis	37.8	53.1	8.2	23.2	39.0	53.9	9.1	5 26 23.47	+ 0 0.19	. .	.39	5 25 58.27	8.67	
	11	ε	Orionis	..	22.0	36.7	51.4	6.0	20.2	34.7	5 28 58.50	— 0 7.01	. .	.38	5 28 26.11	10.15	
	12	α	Columbæ	..	..	..	31.5	49.4	6.7	24.2	5 34 57.95	— 0 26.14	. .	.38	5 34 6.43	6.74	
	13	μ	Geminorum	19.0	34.7	59.5	6.0	21.8	37.4	53.1	6 14 6.07	+ 0 0.33	. .	.36	6 13 41.04	+ 12.12	
	14	δ	Ursæ Minoris, S. P.	24.0	57.0	32.0	7.0	40.0	14.0	48.0	6 22 6.00	— 0 5.39	. .	.35	6 21 35.26	— 51.26	
	15	α	Canis Majoris	3.7	18.5	33.7	49.2	4.3	19.4	34.3	6 38 49.01	+ 0 0.19	. .	.34	6 38 23.86	+ 8.42	
	16	ε	Canis Majoris	12.2	28.8	45.3	2.0	18.7	35.0	51.4	6 53 1.91	.16	. .	25.34	6 52 36.73	7.18	
20	17		Sun, 1st L.	39.7	55.5	10.8	26.2	42.1	57.4	12.9	20 9 26.37	.19	} . .	24.99	20 10 11.09	. .	A.
	18		Sun, 2d L.	58.9	14.4	29.9	45.4	0.9	16.4	31.9	20 11 45.40	.19				. .	
22	19		Sun, 1st L.	6.1	21.6	36.9	52.5	7.8	23.0	38.4	20 17 52.33	.19	} . .	23.78	20 18 38.02	. .	
	20		Sun, 2d L.	24.6	40.1	55.4	11.0	26.4	41.7	57.7	20 20 60.90	.19				. .	
	21		Venus, 1st L.	5.1	19.5	34.0	48.7	3.6	17.8	32.3	22 58 48.71	.23	+ 1.20	.67	22 58 26.53	. .	
	22	ϑ^1	Ceti	59.7	14.0	29.0	43.5	58.1	12.9	27.5	1 16 43.53	.22	. .	.49	1 16 20.26	11.37	
	23	ε	Cassiopeiæ	12.0	43.5	15.4	47.1	19.1	51.0	22.5	1 43 47.23	.76	. .	.45	1 43 24.54	14.97	
	24		Jupiter, 1st L.	59.3	14.0	28.8	43.3	58.7	13.2	28.1	2 1 43.63	.21	+ 1.38	.44	2 1 21.78	. .	
	25		Cassiopeiæ, (744)	2.7	39.3	16.1	52.8	29.8	6.3	42.9	2 16 52.84	.86	. .	.43	2 16 30.27	16.61	
	26	γ	Ceti	0.3	14.8	29.0	43.5	58.2	12.9	27.1	2 35 43.69	.25	. .	.40	2 35 20.54	11.20	
	27	β	Persei	38.0	57.0	15.8	34.9	54.2	12.9	32.1	2 58 34.99	.44	. .	.38	2 58 12.05	13.55	
	28	α	Persei	39.8	1.9	24.2	46.2	9.0	31.1	53.4	3 13 46.51	.53	. .	.38	3 13 23.66	14.62	
	29	η	Tauri	57.6	13.2	28.2	45.0	1.0	16.9	32.4	3 38 45.04	.33	. .	.36	3 38 22.01	12.37	
	30	γ^1	Eridani	30.5	46.6	0.3	14.1	30.6	45.0	0.1	3 51 15.46	.21	. .	.34	3 50 52.33	9.73	
	31	υ^7	Eridani	7.9	24.6	41.5	58.5	15.6	32.2	49.0	4 29 58.47	.16	. .	.29	4 29 35.34	7.70	
	32	α	Aurigæ	42.3	3.2	24.0	44.8	5.8	26.6	47.5	5 5 44.90	.47	. .	.25	5 5 22.12	14.80	
	33	γ	Orionis	33.5	48.1	2.8	17.1	32.0	46.5	0.9	5 17 17.27	.27	. .	23.24	5 16 54.30	10.85	
	34	α	Lyræ	9.1	27.7	46.3	4.8	23.6	42.1	0.8	18 32 4.91	.43	. .	22.66	18 31 42.68	8.99	K.
23	35		Sun, 1st L.	16.8	32.4	47.9	3.2	18.8	34.2	49.6	20 22 3.27	.33	} . .	.58	20 22 50.22	. .	
	36		Sun, 2d L.	35.3	50.8	6.1	21.7	37.2	52.6	8.0	20 24 21.67	.33					
	37		Venus, 1st L.	55.3	9.9	24.4	..	53.6	7.9	22.5	23 0 38.92	.35	+ 1.27	.46	23 0 18.09	. .	
	38		Jupiter, 1st L.	19.0	32.6	48.8	3.4	18.4	32.8	47.9	2 2 3.27	.36	+ 1.38	.30	2 1 42.73	. .	
	39	γ	Ceti	..	13.6	28.1	42.7	57.2	11.8	..	2 35 42.68	.35	. .	.27	2 35 20.76	11.22	
	40	α	Ceti	53.8	8.2	22.8	37.3	51.9	6.1	20.8	2 54 37.27	+ 0 0.35	. .	.26	2 54 15.36	11.21	
	†41	α	Persei	..	1.3	23.5	45.8	8.1	30.5	..	3 13 45.84	— 0 0.10	. .	.24	3 13 23.50	14.64	
	42	γ^1	Eridani	29.3	44.2	59.1	14.0	28.9	43.9	58.8	3 51 14.03	+ 0 0.34	. .	.21	3 50 52.16	9.75	
	43		Vesta	42.2	4.6	19.8	34.9	50.2	5.3	20.3	4 2 34.90	.37	. .	.20	4 2 13.07	. .	
	44	α	Tauri	43.6	58.6	13.8	29.0	44.1	58.8	14.5	4 27 28.91	.37	. .	.18	4 27 7.10	11.78	
	45	β	Tauri	..	24.7	41.3	57.7	14.3	30.2	..	5 16 57.84	+ 0 0.40	. .	.13	5 15 36.11	12.79	
	46	δ	Orionis	..	..	18.5	32.2	46.7	1.2	15.7	5 24 46.66	— 0 14.15	. .	.12	5 24 10.39	10.28	
	47	ε	Orionis	4.5	18.8	33.5	48.0	2.3	17.0	31.3	5 28 47.91	+ 0 0.35	. .	.12	5 28 26.14	10.17	
	48	α	Columbæ	..	53.0	10.8	28.0	45.9	3.0	..	5 34 28.14	.33	. .	.10	5 34 6.37	6.79	
	49	α	Orionis	30.1	44.9	59.5	14.0	28.9	43.2	57.8	5 47 14.06	.36	. .	.10	5 46 52.32	10.85	
	50	μ	Geminorum	15.7	31.2	47.2	2.3	18.4	34.3	49.8	6 14 2.70	+ 0 0.38	. .	.08	6 13 41.00	+ 12.13	
	51	δ	Ursæ Minoris, S. P.	18.5	51.0	29.0	1.0	35.0	6.0	39.0	6 21 59.93	— 0 3.01	. .	.07	6 21 34.85	— 51.75	
	52	α	Canis Majoris	0.1	15.0	30.7	45.7	1.2	15.8	31.0	6 38 45.64	+ 0 0.33	. .	— 22.06	6 38 23.91	+ 8.42	

January 22. At 21*h.* 18*m.* took out 0.1 oz. of mercury without stopping the clock.
41. Observed by reflection.

DATE.	VALUE OF m.	n.	c.	CLOCK. At [illegible]h.	H. Rate. 0s.
	s.	s.	s.	s.	
Jan. 19	+0.118	+0.181	+0.129	f 25.49	l .032
" 20	.118	.181	.129	24.91	.032
" 22	.118	.181	.129	23.44	.057
" 23	.217	.063	.129	22.30	.052

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
Jan. 23	1	ε Canis Majoris . . .	8.8	25.3	41.8	58.4	15.1	31.5	48.0	6 52 58.41	+0 0.33	. .	− 22.05	6 52 36.69	+ 7.19	E
	2	δ Geminorum . . .	..	48.1	3.7	19.2	35.2	50.8	..	7 11 19.40	.38	. .	.04	7 10 57.74	11.85	
	3	α¹ Geminorum . . .	18.3	..	52.8	..	27.0	..	0.9	7 25 9.72	.41	. .	.02	7 24 48.11	12.70	
	4	α² Geminorum . . .	..	35.7	..	10.0	..	44.3	..	7 25 10.03	.41	. .	.02	7 24 48.42	12.70	
	5	α Canis Minoris . . .	54.5	9.1	23.7	38.1	52.8	7.3	22.1	7 31 38.23	.36	. .	.02	7 31 16.57	10.26	
	6	β Geminorum . . .	27.7	44.3	0.8	17.3	33.8	50.2	6.7	7 36 17.26	.40	. .	.01	7 35 55.65	12.15	
24	7	Sun, 1st L.	26.6	42.4	57.8	12.9	28.6	43.9	59.0	20 26 13.03	.33	. .	21.03	20 24 1.43	. .	A
	8	Sun, 2d L.	45.2	0.0	15.9	31.2	46.8	2.0	17.5	20 28 31.23	.33					
	9	Venus, 1st L. . . .	39.2	54.1	8.3	23.0	37.8	51.9	6.4	23 2 22.96	0 0.35	+ 1.29	20.88	23 2 3.72	. .	
	10	Polaris	16.0	54.0	31.0	9.0	49.0	26.0	5.0	1 4 10.00	+0 7.49	. .	.76	1 4 56.73	60.44	
	11	α Arietis	4.8	20.1	36.0	51.8	7.5	23.0	38.8	1 58 51.71	0 0.38	. .	.70	1 58 31.39	12.26	
	12	Jupiter, 1st L. . . .	38.8	53.3	8.3	23.0	37.8	52.7	7.5	2 2 23.04	.36	+ 1.37	.70	2 2 4.01	. .	
	13	Cassiopeiæ, (744) . .	0.0	26.3	13.0	49.5	26.8	3.0	39.8	2 16 49.77	.69	. .	.68	2 16 29.78	16.68	
	14	γ Ceti	57.5	12.0	26.0	41.1	55.8	10.0	24.7	2 35 41.13	+0 0.35	. .	.66	2 35 20.82	11.23	
	15	β Ursæ Minoris, S. P. .	46.5	42.0	36.5	31.7	27.3	22.0	17.5	2 51 31.93	−0 0.50	. .	.65	2 51 10.78	1.17	
	16	α Persei	37.0	59.3	21.3	43.5	5.9	29.0	50.2	3 13 43.60	+0 0.49	. .	.63	3 13 23.46	14.66	
	17	η Tauri	55.0	10.7	26.5	42.3	58.2	13.8	29.9	3 38 42.34	+0 0.39	. .	.60	3 38 22.13	+ 12.40	
	18	ζ Ursæ Minoris, S. P. .	24.5	35.0	45.5	58.0	8.7	20.2	31.0	3 49 57.56	−0 0.72	. .	.59	3 49 36.25	− 4.54	
	19	Vesta	54.5	9.5	25.0	40.0	55.2	10.2	25.2	4 2 39.94	+0 0.37	. .	.58	4 2 19.73	. .	
	20	η Draconis, S. P. . .	42.0	12.7	43.0	14.2	44.7	15.3	46.3	4 22 14.03	−0 0.18	. .	.56	4 21 53.29	+ 4.91	
	21	α Tauri	42.2	57.0	12.4	27.5	42.8	57.8	12.6	4 27 27.47	+0 0.37	. .	.56	4 27 7.28	+ 11.79	
	22	ε Ursæ Minoris, S. P. .	46.0	33.5	20.5	9.0	57.0	45.3	32.7	5 2 9.14	−0 1.21	. .	.52	5 1 47.41	− 16.38	
	23	γ Orionis	31.0	45.5	0.1	14.8	29.2	43.7	58.4	5 17 14.67	+0 0.36	. .	.50	5 16 54.53	+ 10.85	
	24	δ Orionis	47.2	1.5	16.4	30.5	45.3	59.5	14.1	5 24 30.64	.35	. .	.50	5 24 10.49	10.28	
	25	ε Orionis	2.8	17.2	31.9	46.2	1.0	15.2	29.9	5 28 46.31	+0 0.35	. .	.49	5 28 26.17	10.18	
	26	ξ Draconis, S. P. . .	51.5	18.0	44.0	10.7	37.0	4.0	30.7	5 51 10.84	−0 0.12	. .	.47	5 50 50.25	+ 5.84	
	27	δ Ursæ Minoris, S. P. .	46.0	51.0	51.5	59.0	2.5	7.5	10.5	6 21 58.29	−0 3.01	. .	.44	6 21 34.84	− 51.80	
	28	α Canis Majoris . . .	58.8	13.6	29.0	44.2	59.3	14.1	29.1	6 38 44.01	+0 0.33	. .	20.43	6 38 23.91	+ 8.42	
26	29	Venus, 1st L. . . .	50.2	4.8	19.3	33.7	48.4	2.7	17.2	23 5 33.76	.35	+ 1.32	18.36	23 5 17.07	. .	K
	30	Jupiter, 1st L. . . .	21.4	36.2	50.9	5.8	20.7	35.4	50.2	2 3 5.71	+0 0.36	+ 1.36	.22	2 2 49.21	. .	
	31	γ Ceti	..	..	..	..	..	7.7	22.1	2 36 14.90	−0 35.92	. .	.19	2 35 20.79	11.26	
	32	α Ceti	59.8	4.1	18.7	33.0	47.8	2.4	16.8	2 54 33.23	+0 0.35	. .	.18	2 54 15.40	11.25	
	33	α Persei	34.3	56.9	19.0	41.1	3.8	25.6	48.0	3 13 41.24	.49	. .	.16	3 13 23.57	14.70	
	34	η Tauri	52.4	8.2	24.1	39.9	55.8	11.4	27.3	3 38 39.87	.39	. .	.15	3 38 22.11	12.42	
	35	Tauri, (1176) . . .	33.0	..	4.7	..	36.4	..	7.9	3 40 20.62	.39	. .	.14	3 40 2.87	12.42	
	36	Tauri, (1177) . . .	..	49.9	..	21.6	..	53.2	..	3 40 21.61	.39	. .	18.14	3 40 3.86	12.43	
27	37	Mercury, 2d L. . .	7.7	23.3	39.2	54.9	10.9	26.6	42.3	19 9 54.99	.33	− 0.21	16.34	19 9 38.98	. .	
	38	α Aquilæ	47.8	2.7	17.2	31.8	46.6	1.1	15.7	19 43 31.81	.36	. .	.33	19 43 15.84	12.03	
	39	α Cygni	24.6	45.0	5.5	25.8	46.5	6.8	27.1	20 36 25.90	.46	. .	.31	20 36 10.05	9.06	
28	40	Sun, 1st L. . . .	0.3	15.7	31.0	46.3	1.8	17.0	32.2	20 42 46.33	.25	. .	.38	20 43 38.82	. .	
	41	Sun, 2d L.	17.7	32.9	48.3	3.5	19.0	34.2	49.4	20 45 3.57	.25					
	42	α Cephei	35.4	6.1	37.1	7.7	38.8	9.5	40.3	21 15 7.84	.35	. .	.37	21 14 51.82	7.35	
	43	β Cephei	45.5	27.7	9.9	51.8	34.5	16.1	58.0	21 26 51.93	+0 0.56	. .	.36	21 26 36.13	5.65	
	44	α Pegasi	..	..	..	..	..	51.5	6.4	22 57 58.95	−0 37.11	. .	.33	22 57 5.51	11.89	
	45	Venus, 1st L. . . .	..	49.9	4.4	18.9	33.6	47.9	..	23 8 18.94	+0 0.27	+ 1.37	.33	23 8 4.25	. .	
	46	γ Cephei	8.4	11.3	15.1	17.8	21.9	25.1	28.1	23 33 18.24	0 0.75	. .	.32	23 33 2.67	10.72	
	†47	Polaris	9.5	46.5	25.0	6.0	44.0	22.0	2.0	1 4 5.00	+0 4.57	. .	.29	1 4 53.28	63.75	
	48	ϑ¹ Ceti	..	..	..	..	50.8	5.4	20.1	1 17 5.43	−0 29.17	. .	.29	1 16 19.97	11.46	
	49	Mars, 1st L. . . .	21.4	36.1	50.8	5.4	20.4	35.0	49.7	1 28 5.54	+0 0.28	+ 0.21	.28	1 27 49.54	. .	
	50	α Arietis	59.9	15.7	31.4	47.1	3.0	18.6	34.3	1 58 47.14	.30	. .	.27	1 58 31.17	+ 12.33	
	51	Jupiter, 1st L. . . .	7.0	..	36.6	..	6.4	..	35.7	2 3 51.39	.28	. .	− 16.27	2 3 36.66	. .	
	52	Jupiter, 2d L. . . .	..	24.3	..	53.8	..	23.5	..	2 3 53.91	+0 0.28					

DATE.	VALUE OF m.	n.	c.	CLOCK. At 2h.	H. Rate. 0s.
	s.	s.	s.	s.	
Jan. 23	+0.217	+0.063	+0.129	f 22.30	l .052
" 24	.217	.063	.129	20.70	.059
" 26	.217	.063	.129	18.22	.046
" 27	.217	.063	.129	16.68	.020
" 28	.217	.063	.052	16.27	.020

47. Polaris observed over Micrometer at ½ revs.
Jan. 28. Adjusted for collimation.

TE. 16.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to **1850.0**	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
28	1	γ Ceti	53.0	7.5	22.1	36.6	51.2	5.7	20.2	2 35 36.61	+ 0 0.27	. .	— 16.26	2 35 20.62	+ 11.29	K.
	2	α Ceti	47.7	2.2	16.8	31.2	45.8	0.8	14.8	2 54 31.26	.27	. .	.25	2 54 15.28	11.28	
	3	α Persei	32.5	54.8	17.0	39.1	1.6	23.8	45.9	3 13 39.24	.39	. .	.25	3 13 23.38	14.76	
	4	α Aurigæ	35.3	56.1	16.9	37.8	58.9	19.5	40.0	5 5 37.79	.38	. .	.21	5 5 21.96	14.88	
	5	δ Orionis	22.9	57.3	12.0	26.4	41.2	55.2	9.8	5 24 26.40	.27	. .	.20	5 24 10.47	10.31	
	6	μ Geminorum	9.7	25.4	41.1	56.7	12.9	28.2	43.7	6 13 56.81	.30	. .	.19	6 13 40.92	12.14	
	7	α Canis Majoris . . .	54.7	9.8	24.8	40.1	55.2	10.2	25.4	6 38 40.03	.25	. .	.18	6 38 24.10	8.44	
	8	α^1 Geminorum	12.4	..	46.9	..	21.2	..	55.3	7 25 3.94	.32	. .	.16	7 24 48.10	12.69	
	9	α^2 Geminorum	..	30.2	..	4.4	..	38.8	..	7 25 4.51	.32	. .	.16	7 24 48.67	12.69	
	10	α Canis Minoris . . .	..	3.3	17.8	32.3	47.2	1.7	..	7 31 32.46	.27	. .	.16	7 31 16.57	10.25	
	11	β Geminorum	22.2	38.5	54.8	11.3	28.2	44.5	0.8	7 36 11.47	.31	. .	.16	7 35 55.62	12.13	
	12	15 Argus	30.1	45.4	1.8	17.3	33.7	49.2	4.9	8 1 17.49	.25	. .	.15	8 1 1.59	7.84	
	13	ι Ursæ Majoris . . .	51.0	12.8	35.1	56.8	19.1	40.8	2.7	8 48 56.90	.39	. .	.13	8 48 41.16	13.57	
4	14	α Cassiopeiæ	57.5	20.0	42.2	4.3	26.3	48.9	11.0	0 32 4.31	.34	. .	15.73	0 31 48.92	12.91	A.
	15	γ Ceti	58.0	10.5	23.8	36.0	48.4	0.5	13.5	2 35 35.81	.53	. .	.70	2 35 20.64	11.46	
	16	α Ceti	53.0	5.3	18.0	30.5	43.0	55.4	7.9	2 54 30.44	.53	. .	.70	2 54 15.27	11.39	
	17	α Persei	41.3	0.7	19.9	39.0	57.8	17.0	36.5	3 13 38.89	.37	. .	.69	3 13 23.57	14.93	
	18	η Tauri	56.0	10.0	23.8	37.0	51.0	4.7	18.0	3 38 37.21	.47	. .	.69	3 38 21.99	12.56	
	19	Moon, 1st L.	20.4	34.0	47.8	1.0	14.7	28.1	41.5	4 19 1.07	.48	+ 65.92	.68	4 19 51.79	. .	
	20	α Tauri	43.0	55.8	9.5	22.2	35.5	48.7	1.2	4 27 22.27	.49	. .	.67	4 27 7.09	11.93	
	21	α Aurigæ	43.2	1.3	19.4	37.2	55.6	13.2	31.1	5 5 37.28	.39	. .	.66	5 5 22.01	15.00	
	22	β Tauri	8.1	22.6	36.0	51.3	5.4	19.8	33.8	5 16 51.00	.45	. .	.66	5 16 35.79	12.92	
	23	α Leporis	33.4	46.3	0.3	12.9	26.1	39.2	52.9	5 26 13.01	.61	. .	.66	5 25 57.96	8.79	
	24	α Columbæ	35.6	50.8	6.1	21.1	36.1	51.2	6.5	5 34 21.06	.69	. .	.66	5 34 6.09	6.96	
	25	α Orionis	29.5	42.1	55.0	7.3	20.0	32.6	45.0	5 47 7.36	.52	. .	.65	5 46 52.23	10.95	
	26	μ Geminorum	15.5	29.0	42.8	56.0	9.4	23.2	37.0	6 13 56.13	+ 0 0.47	. .	.65	6 13 40.95	12.20	
	27	51 (Hev.) Cephei . . .	12.5	34.0	58.5	20.2	41.0	3.5	25.0	6 27 19.24	— 0 1.84	. .	.64	6 27 1.76	91.41	
	28	α Canis Majoris . . .	0.6	12.5	26.0	38.9	51.8	5.0	17.9	6 38 38.96	+ 0 0.60	. .	.64	6 38 23.92	8.46	
	29	α Canis Minoris . . .	54.2	6.4	19.0	31.7	44.2	56.9	9.1	7 31 31.64	.53	. .	.63	7 31 16.54	10.26	
	30	α Aquilæ	53.5	6.0	18.8	31.5	44.0	56.7	9.2	19 43 31.39	.51	. .	.80	19 43 16.10	11.90	K.
5	†31	Sun, 1st L.	41.8	54.9	7.9	20.8	33.9	47.3	59.9	21 15 20.93	.60	. .	.42	21 16 13.83	. .	A.
	†32	Sun, 2d L.	57.2	10.2	23.6	36.5	49.5	2.3	15.3	21 17 36.37	.60					
	33	β Ursæ Minoris, S. P. .	5.0	52.1	40.2	27.0	14.5	2.3	50.3	2 51 27.34	+ 0 0.11	. .	.70	2 51 11.75	0.10	K.
	34	α Persei	..	..	19.8	38.9	57.8	17.2	36.2	3 13 57.98	— 0 18.79	. .	.69	3 13 23.50	14.96	
	35	η Tauri	56.3	10.0	23.8	37.3	50.8	4.5	18.1	3 38 37.26	+ 0 0.48	. .	.69	3 38 22.05	12.58	
	36	f Pleiadum	36.7	..	4.2	..	31.3	..	58.7	3 40 17.77	.48	. .	.68	3 40 2.57	12.57	
	37	h Pleiadum	..	51.8	..	19.0	..	46.4	..	3 40 19.01	.48	. .	.68	3 40 3.81	12.59	
	38	Moon, 1st L.	26.3	40.0	53.5	7.3	20.8	34.3	47.8	5 12 7.14	.48	+ 65.58	.66	5 12 57.55	. .	
	39	ο Tauri	0.2	13.9	27.3	40.8	54.1	7.6	21.0	5 18 40.70	.47	. .	.66	5 18 25.51	12.29	
	40	δ Orionis	47.8	0.4	12.9	25.5	37.8	50.3	2.8	5 24 25.36	.54	. .	.66	5 24 10.24	10.40	
	41	ζ Tauri	3.8	17.2	30.8	44.1	57.1	10.8	24.1	5 28 43.99	.47	. .	.66	5 28 28.80	12.19	
	42	α Orionis	29.4	41.9	54.7	7.1	19.8	32.3	45.0	5 47 7.17	+ 0 0.51	. .	.65	5 46 52.03	+ 10.95	
	43	δ Ursæ Minoris, S. P. .	..	..	23.0	53.0	19.0	53.0	25.0	6 25 22.60	— 3 29.18	. .	.64	6 21 37.78	— 53.10	
13	44	β Tauri	3.2	17.8	31.9	45.9	0.2	14.6	28.8	5 16 46.06	+ 0 7.49	. .	17.78	5 16 35.77	+ 13.05	
	45	δ Orionis	..	56.4	8.8	21.0	33.7	46.2	..	5 24 21.22	6.81	. .	.78	5 24 10.25	10.51	
	46	ε Orionis	59.5	11.9	24.3	36.8	49.2	1.8	14.4	5 28 36.84	+ 0 6.76	. .	.78	5 28 25.82	10.42	
	47	α Columbæ	..	..	0.3	15.2	30.5	45.8	1.2	5 34 30.60	— 0 6.81	. .	.78	5 34 6.01	7.13	
	48	α Orionis	25.1	38.0	50.2	2.9	15.7	28.2	41.0	5 47 3.01	+ 0 6.84	. .	.79	5 46 52.06	+ 11.06	
	49	δ Ursæ Minoris, S. P. .	3.0	37.0	8.0	40.8	9.0	40.0	10.0	6 23 38.14	— 1 40.45	. .	.79	6 21 39.90	— 55.99	
	50	α Canis Majoris . . .	54.4	8.6	21.5	34.4	47.3	0.6	13.8	6 38 34.34	+ 0 7.25	. .	.80	6 38 23.79	+ 8.55	
	51	α^2 Geminorum . . .	14.3	29.1	43.9	58.4	13.2	28.2	43.0	7 24 58.58	7.77	. .	.81	7 24 48.54	12.74	
16	52	α Columbæ	31.4	46.8	1.8	16.5	31.9	47.3	2.6	5 34 16.90	+ 0 7.70	. .	— 18.67	5 34 5.93	+ 7.20	

eb. 4. Turned eye-tube 90°, so as to make micrometer move in altitude instead of azimuth.
rom Feb. 6th to 13th, altering eye-piece and diaphragm for the catalogue.
eb. 13. The middle wire was made by mistake to coincide with the image of a side wire in adjusting for collimation—hence the large value of *c*.
1, 32, +0.36 applied to correction for clock, on account of personal equation between A. and K.

DATE.		VALUE OF			CLOCK.	H. Rate.
		m.	*n.*	*c.*	At	0*s.*
		s.	s.	s.	s.	
Jan.	28	+0.217	+0.063	+0.052	*f* 16.27	*l* .020
Feb.	4	.449	—0.188	.092	15.71	.015
"	5	.449	.188	.092	15.71	.015
"	13	.482	.290	6.303	17.74	*g* .013
"	16	+0.197	—0.308	+6.156	18.63	.013

APPARENT RIGHT ASCENSIONS OBSERVED WITH THE WEST TRANSIT INSTRUMENT.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.
Feb. 16	1	α Orionis	..	..	..	..	16.8	29.7	42.4	5 47 29.63	— 0 18.87	. .	— 18.68	5 46 52.08
	2	δ Ursæ Minoris, S. P. .	2.0	35.0	8.0	39.0	9.0	38.0	10.8	6 23 37.43	— 1 37.95	. .	.68	6 21 40.80
	3	α Canis Majoris . . .	56.6	9.8	22.7	35.8	48.8	2.0	15.2	6 38 35.84	+ 0 6.63	. .	.69	6 38 23.78
	4	α² Geminorum . . .	..	..	45.2	59.8	14.5	29.7	44.6	7 25 14.76	— 0 7.49	. .	.70	7 24 48.57
	5	α Canis Minoris . . .	51.1	3.8	16.4	28.7	41.3	54.1	6.8	7 31 28.89	+ 0 6.36	. .	.70	7 31 16.55
	6	β Geminorum . . .	24.7	39.0	53.0	7.1	21.4	35.7	50.0	7 36 7.27	7.11	. .	.70	7 35 55.68
	7	ι Ursæ Majoris . . .	54.0	13.1	31.8	50.6	9.8	28.5	48.0	8 48 50.83	+ 0 9.34	. .	.71	8 48 41.46
18	8	α Aurigæ	46.3	4.7	22.5	40.2	58.5	16.4	34.7	5 5 40.47	— 0 0.02	. .	.59	5 5 21.86
	9	β Orionis	..	3.8	16.0	28.8	41.4	54.2	7.1	5 7 35.22	6.67	. .	.59	5 7 9.96
	10	β Tauri	11.6	26.1	40.2	54.3	8.4	22.8	37.4	5 16 54.40	0.15	. .	.59	5 16 35.66
	11	δ Orionis	..	4.2	16.5	28.8	41.4	54.2	6.8	5 24 35.21	6.37	. .	.59	5 24 10.05
	12	ε Orionis	7.2	19.8	32.2	44.5	57.0	9.8	22.3	5 28 44.69	0.32	. .	.59	5 28 25.78
	13	α Orionis	33.1	46.1	58.0	10.9	23.7	36.2	49.0	5 47 11.00	— 0 0.27	. .	.59	5 46 52.14
	14	δ Ursæ Minoris, S. P. .	24.5	58.0	30.0	1.5	30.0	..	31.5	6 20 49.25	+ 1 37.97	. .	.59	6 21 38.63
	15	ε Canis Majoris . . .	12.8	27.1	41.3	55.7	9.7	24.0	38.7	6 52 55.61	— 0 0.51	. .	.59	6 52 36.51
	16	δ Geminorum . . .	35.8	49.7	3.0	16.5	30.0	43.6	57.2	7 11 16.54	.18	. .	.59	7 10 57.77
	17	α² Geminorum . . .	22.8	37.9	52.1	7.0	21.8	37.0	52.0	7 25 7.23	— 0 0.12	. .	.59	7 24 48.52
19	18	α Cephei	51.8	18.4	44.9	11.2	38.0	4.8	31.8	21 15 11.56	+ 0 0.18	. .	19.02	21 14 52.72
	19	β Cephei	..	42.6	19.0	55.2	31.4	8.2	45.1	21 27 13.58	— 1 18.02	. .	.02	21 26 36.54
	20	Mercury, 1st L. . .	7.7	21.0	34.2	47.0	0.4	13.5	26.8	21 36 47.23	0 0.40	+ 0.22	.01	21 36 28.04
20	21	Sun, 1st L. . . .	36.3	49.2	1.9	14.8	27.6	40.3	53.2	22 14 14.76	.36	. .	.05	22 15 1.40
	22	Sun, 2d L. . . .	48.5	1.3	14.0	26.8	39.6	52.4	5.4	22 16 26.86	.36			
	23	Venus, 1st L. . .	50.7	3.3	15.8	28.2	40.7	53.3	5.9	23 2 28.27	— 0 0.30	+ 1.22	.05	23 2 10.14
	24	γ Cephei	36.3	31.3	..	..	..	10.2	6.0	23 33 20.95	+ 0 0.42	. .	.06	23 33 2.31
	25	α Herculis	18.9	32.0	44.8	57.7	10.6	23.6	36.7	17 7 57.76	— 0 0.17	. .	.21	17 7 38.38
	26	α Ophiuchi	28.7	41.8	54.5	7.2	19.8	32.9	45.9	17 28 7.26	— 0 0.16	. .	.22	17 27 47.88
	27	γ Draconis	20.2	40.8	0.5	20.4	40.4	0.8	21.2	17 53 20.61	+ 0 0.03	. .	.22	17 53 1.42
	28	Moon, 2d L. . . .	4.2	18.0	31.3	44.8	58.9	12.6	26.5	18 14 45.19	— 0 0.42	— 67.53	.22	18 13 18.02
21	29	β Orionis	51.1	3.6	16.2	28.9	41.0	54.0	7.2	5 7 28.86	.35	. .	18.93	5 7 9.58
	30	β Tauri	12.0	26.3	40.5	54.5	8.9	23.3	37.9	5 16 54.77	.15	. .	.93	5 16 35.69
	31	δ Orionis	51.9	4.4	16.8	29.0	42.0	54.4	7.0	5 24 29.36	.31	. .	.93	5 24 10.12
	32	ε Orionis	7.7	20.1	32.2	44.9	57.2	10.0	22.7	5 28 44.97	.32	. .	.93	5 28 25.72
	33	ζ Orionis	42.9	55.0	7.9	20.0	32.7	45.1	58.0	5 33 20.23	.32	. .	.93	5 33 0.98
	34	α Orionis	33.2	46.0	58.5	10.9	23.9	36.3	49.0	5 47 11.11	— 0 0.27	. .	.94	5 46 51.90
	35	51 (Hev.) Cephei . .	8.0	32.0	49.5	9.5	31.5	58.5	24.0	6 27 13.29	+ 0 4.32	. .	.94	6 26 58.67
	36	α Canis Majoris . . .	3.8	16.9	30.0	42.9	55.9	9.1	22.4	6 38 43.00	— 0 0.40	. .	.95	6 38 23.65
	37	α² Geminorum . . .	23.0	37.9	52.5	7.3	22.3	37.2	52.1	7 25 7.47	.13	. .	.96	7 24 48.38
	38	α Canis Minoris . . .	58.0	10.5	23.1	35.2	48.1	0.9	13.5	7 31 35.61	.28	. .	.96	7 31 16.37
	39	β Geminorum . . .	31.6	46.1	0.2	14.1	28.6	43.0	57.4	7 36 14.43	.15	. .	.96	7 35 55.32
22	40	α Cygni	..	55.2	12.7	30.2	47.7	5.7	23.3	20 36 39.13	8.84	. .	19.80	20 36 10.49
	41	ζ Cygni	59.7	14.1	28.4	42.8	57.1	11.7	26.4	21 6 42.74	— 0 0.14	. .	.80	21 6 22.80
	42	α Cephei	52.0	19.1	45.4	11.8	38.6	5.3	32.3	21 15 12.07	+ 0 0.18	. .	.80	21 14 52.45
	43	Mercury, 2d L. . .	..	..	..	..	16.0	..	..	21 56 16.00	— 0 13.20	— 0.21	.81	21 55 42.78
23	44	Sun, 1st L. . . .	4.2	17.2	29.7	42.3	55.1	7.8	20.8	22 25 42.44	0.36	. .	.82	22 26 28.11
	45	Sun, 2d L. . . .	16.0	28.8	41.3	54.0	6.8	19.4	32.7	22 27 54.14	.36			
	46	Venus, 1st L. . . .	..	..	21.4	33.7	46.3	58.8	11.7	22 56 46.38	12.80	+ 1.23	.83	22 56 14.98
	47	γ Cephei	37.0	..	..	..	..	10.2	6.0	23 33 57.73	35.98	. .	.83	23 33 1.92
	48	α Andromedæ	3.8	18.2	32.3	46.4	0.7	14.8	29.4	0 0 46.51	0.15	. .	.84	0 0 26.52
	49	γ Pegasi	..	13.3	26.2	38.8	51.8	5.0	18.0	0 5 45.52	— 0 6.69	. .	.84	0 5 18.99
	50	α Cassiopeiæ	1.4	23.9	45.7	7.8	30.1	52.7	15.0	0 32 8.08	+ 0 0.09	. .	.85	0 31 48.32
	51	Polaris	4.0	5.0	57.0	48.0	45.0	..	53.0	1 1 15.33	+ 2 46.80	. .	.85	1 3 42.28
	52	α Aurigæ	..	..	22.8	41.3	59.3	17.5	35.8	5 5 59.34	— 0 17.95	. .	— 19.91	5 5 21.48

DATE.	VALUE OF m.	n.	c.	CLOCK. At 2h.	H. Rate. 0s.
	s.	s.	s.	s.	
Feb. 16	+0.197	—0.308	+6.156	f 18.58	g .013
" 18	—0.203	+0.325	—0.108	18.60	l .002
" 19	.203	.325	.108	18.85	g .009
" 20	.203	.325	.108	19.08	.009
" 21	.203	.325	.108	18.89	.013
" 22	.203	.325	.108	19.56	.013
" 23	—0.203	+0.325	—0.108	19.87	.013

Feb. 18, Afternoon; adjusted for level, azimuth, and collimation.

E	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
23	1	β Tauri	13.0	27.5	41.7	55.7	9.9	24.3	38.7	5 16 55.83	— 0 0.15	. .	— 19.91	5 16 35.77	+ 13.22	K.
	2	δ Orionis	52.8	2.6	17.9	30.1	42.7	55.5	8.1	5 24 30.39	.31	. .	.91	5 24 10.17	10.67	
	3	ε Orionis	8.7	21.2	23.5	46.0	58.4	11.1	23.8	5 28 46.10	.32	. .	.91	5 28 25.87	10.56	
	4	α Orionis	34.3	47.2	59.8	12.0	24.8	37.6	50.3	5 47 12.29	.35	. .	.92	5 46 52.02	11.20	
	†5	Anonymous . . .	12.8	27.6	41.8	56.2	10.3	25.1	39.8	6 5 56.23	.14	. .	.92	6 5 36.17	+ 13.12	
	6	δ Ursæ Minoris, S. P. .	30.5	3.0	37.0	9.0	37.0	4.0	37.0	6 22 5.36	3.83	. .	.92	6 21 41.61	— 58.82	
	7	δ Geminorum . . .	37.2	50.9	4.4	17.7	31.2	45.0	58.7	7 11 17.87	0.20	. .	.93	7 10 57.74	+ 12.07	
	8	ε Hydræ	22.3	34.9	47.4	59.8	12.4	25.2	38.0	8 39 0.00	.27	. .	20.27	8 38 39.46	10.37	A.
25	9	ι Ursæ Majoris . . .	4.5	23.7	32.8	1.0	20.6	39.9	58.8	8 49 1.19	.00	. .	.27	8 48 40.92	13.52	
	10	α Hydræ	46.3	59.2	11.9	24.1	37.0	49.8	2.5	9 20 24.40	.27	. .	.28	9 20 3.85	9.35	
	11	ε Leonis	47.8	1.7	15.3	29.0	42.9	56.7	10.7	9 37 29.16	.12	. .	.28	9 37 8.76	11.14	
	12	μ Leonis	40.7	54.9	8.3	22.9	36.7	50.9	5.0	9 44 22.77	— 0 0.16	. .	.29	9 44 2.32	11.14	
	13	α Ursæ Majoris . . .	12.1	39.8	6.8	33.9	1.0	29.0	56.0	10 54 34.09	+ 0 0.19	. .	.30	10 54 13.97	11.72	
	14	δ Leonis	37.1	51.0	4.2	17.2	31.0	44.9	58.1	11 6 17.64	— 0 0.19	. .	.31	11 5 57.14	10.40	
	15	Mercury	51.2	4.5	17.1	30.0	42.8	55.8	9.2	22 17 30.09	0.37	. .	.46	22 17 9.27	. .	K.
26	16	Venus, 1st L. . .	..	..	..	..	11.3	24.2	36.8	22 50 24.10	25.47	+ 1.97	.99	22 49 37.64	. .	
	17	δ Orionis	53.8	6.7	68.7	31.3	43.8	56.4	9.1	5 24 31.40	0.31	. .	21.09	5 24 10.00	10.73	
	18	ε Orionis	9.6	22.1	34.7	46.8	59.2	12.2	24.8	5 28 47.06	.32	. .	.09	5 28 25.65	10.61	
	19	α Orionis	35.2	48.0	0.7	13.1	25.8	38.7	51.3	5 47 13.26	0.35	. .	.09	5 46 51.82	+ 11.25	
	20	δ Ursæ Minoris, S. P. .	..	6.5	40.5	9.0	39.0	6.5	40.0	6 23 53.58	1 49.57	. .	.10	6 21 42.91	— 59.80	
	21	δ Geminorum . . .	38.1	52.0	5.3	18.6	32.3	46.0	59.5	7 11 18.73	0 0.20	. .	.11	7 10 57.42	+ 12.10	
	22	α² Geminorum . . .	25.1	40.2	55.0	9.8	24.3	39.3	54.3	7 25 9.71	.12	. .	.11	7 24 48.48	12.88	
	23	α Canis Minoris . . .	0.1	12.8	25.2	38.0	50.3	2.9	15.8	7 31 37.87	.34	. .	.11	7 31 16.42	10.41	
3	24	Sun, 1st L.	13.1	25.7	38.3	50.2	3.0	15.9	28.8	22 55 50.71	.20	. .	22.01	22 56 33.68	. .	A.
	25	Sun, 2d L. . . .	23.4	36.1	48.6	0.7	13.4	26.2	39.1	22 58 1.07	.20					
	26	α Tauri	49.8	3.0	15.8	28.6	41.8	55.0	8.1	4 27 28.87	.15	. .	.04	4 27 6.68	13.39	
	27	β Tauri	14.9	29.0	43.2	57.3	11.8	26.0	40.2	5 16 57.49	.13	. .	.05	5 16 35.31	13.38	
	28	α Leporis	40.5	53.5	6.7	19.9	33.0	46.2	59.7	5 26 19.93	.23	. .	.05	5 25 57.65	9.31	
	†29	α Columbæ	42.6	57.9	13.0	27.5	42.8	59.2	13.5	5 34 28.07	.28	. .	.05	5 34 5.74	7.54	
	30	β Aurigæ	45.0	3.0	20.4	38.1	55.9	13.7	31.7	5 48 38.26	.11	. .	.06	5 48 16.09	+ 15.31	
	31	δ Ursæ Minoris, S. P. .	33.5	6.0	40.5	10.8	36.8	6.5	39.0	6 22 7.47	.02	. .	.06	6 21 41.39	— 61.54	
	32	α Canis Majoris . . .	6.6	19.8	33.0	45.8	58.9	11.8	25.2	6 38 45.87	.22	. .	.06	6 38 23.59	+ 8.86	
	33	α² Geminorum . . .	26.1	41.0	55.7	10.3	25.0	40.1	55.1	7 25 10.47	.13	. .	.07	7 24 48.27	12.95	
	34	σ² Ursæ Majoris . . .	32.8	6.0	39.0	11.3	44.8	17.8	51.7	8 57 11.91	— 0 0.07	. .	.08	8 56 49.76	17.22	
	35	α Cephei	55.0	22.0	48.5	15.0	41.3	8.2	35.2	21 15 15.03	+ 0 0.05	. .	.79	21 14 53.29	7.01	K.
4	36	Sun, 1st L. . . .	56.8	9.6	22.2	34.6	47.3	0.3	12.7	23 59 34.79	— 0 0.29	. .	.80	23 0 16.91	. .	
	37	Sun, 2d L. . . .	7.2	20.0	32.3	44.8	57.4	10.4	23.1	23 1 45.03	— 0 0.29					
	38	Polaris	1.0	2.0	55.0	47.0	42.0	45.0	48.0	1 3 51.43	+ 0 4.73	. .	.80	1 3 36.36	85.99	
	39	α Aurigæ	..	8.3	26.0	43.8	1.7	20.0	38.2	5 5 53.00	— 0 9.09	. .	.80	5 5 21.11	15.65	
	40	β Tauri	15.3	29.8	44.0	58.1	12.5	26.7	41.1	5 16 58.21	0.20	. .	.80	5 16 35.22	13.40	
	41	ε Orionis	..	..	..	..	1.0	13.7	26.3	5 29 13.67	25.32	. .	.80	5 28 25.56	10.72	
	42	α Orionis	36.9	39.8	2.3	14.7	27.2	40.1	52.8	5 47 14.83	0.26	. .	.80	5 46 51.77	+ 11.35	
	43	δ Ursæ Minoris, S. P. .	35.0	9.0	41.5	13.0	40.0	9.0	43.0	6 22 10.07	2.34	. .	.81	6 21 43.92	— 61.86	
	44	α Canis Majoris . .	7.6	20.8	33.7	46.3	59.7	12.8	26.0	6 38 46.70	0.33	. .	.81	6 38 23.56	+ 8.87	
5	45	Sun. 1st L. . . .	40.6	53.1	5.7	18.2	30.8	43.6	56.3	23 3 18.33	.29	. .	.85	23 4 0.26	. .	
	46	Sun, 2d L. . . .	50.5	3.1	16.0	28.3	41.1	53.7	6.6	23 5 28.47	.29					
	47	Venus, 2d L. . . .	21.3	33.8	46.4	58.7	11.3	23.7	36.5	22 31 58.81	.26	— 1.97	.85	22 31 35.70	. .	
6	48	Sun, 1st L. . . .	..	35.7	48.2	0.8	13.2	26.0	38.8	23 7 7.12	6.58	. .	.90	23 7 42.63	. .	
	49	Sun, 2d L. . . .	33.0	45.7	58.2	10.7	23.3	36.0	48.8	23 9 10.81	0.28					
	50	Mercury, 1st L. . .	19.2	32.0	44.4	56.8	9.5	22.4	35.3	23 12 57.08	.29	+ 0.16	.90	23 12 33.89	. .	
	51	Venus, 2d L. . . .	17.8	30.4	42.9	55.3	7.6	20.3	33.2	22 29 55.36	.26	— 1.95	.90	22 29 32.20	. .	
7	52	Sun, 1st L. . . .	4.7	17.3	29.8	42.3	55.2	8.0	20.8	23 10 42.57	— 0 0.28	. .	— 22.96	23 10 19.33	. .	

5. Dec. 29° 33′ N.
29. Bad observation.
Feb. 28. Took off the micrometer diaphragm, adjusted wire, and replaced the plate without disturbing adjustments for focus.
Mar. 4. Examined collimation; Mid. wire and image in coincidence.

DATE.	VALUE OF m.	n.	c.	CLOCK. At 4h.	H. Rate. 0s.
	s.	s.	s.	s.	
Feb. 23	—0.203	+0.325	—0.108	f 19.84	g .013
" 25	.203	.325	.108	20.15	.014
" 26	.203	.325	.108	21.01	.014
Mar. 3	.070	.111	.108	22.04	.008
" 4	.171	.237	.108	22.80	.002
" 5	.171	.237	.108	22.85	.002
" 6	.171	.237	.108	22.91	.002
" 7	.171	.237	.108	22.96	.002

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
Mar. 7	1	Sun, 2d L.	14.7	27.3	39.7	52.4	5.1	17.7	30.4	23 12 52.47	— 0 0.28	. .	— 22.95	23 12 29.24	. .	K
	2	α^2 Geminorum	27.0	41.8	56.6	11.3	26.0	41.2	55.8	7 25 11.39	.20	. .	.97	7 24 48.22	+ 13.01	
	3	Moon, 1st L.	20.3	33.8	47.2	0.2	13.4	26.8	40.5	7 29 0.31	.23	+ 13.77	.97	7 29 40.88	. .	
	4	β Geminorum	35.7	50.1	4.3	18.5	32.7	46.8	1.5	7 36 18.51	.20	. .	.97	7 35 55.34	12.41	
9	5	Sun, 1st L.	27.0	39.9	52.2	4.8	17.3	30.0	42.8	23 18 4.86	.33	. .	.29	23 18 47.09	. .	A.
	6	Sun, 2d L.	36.9	49.5	2.0	14.1	27.0	39.8	52.6	23 20 14.56	— 0 0.33					
	7	α Cassiopeiæ	3.6	25.9	48.0	10.1	32.4	54.8	17.2	0 32 10.29	+ 0 0.09	. .	.29	0 31 48.09	13.46	
	8	Polaris	..	..	47.5	39.0	35.0	38.5	38.5	1 11 39.70	— 7 47.62	. .	.29	1 3 29.79	+ 87.85	
	9	δ Ursæ Minoris, S. P.	40.2	13.0	44.5	14.0	43.5	10.5	45.0	6 22 12.96	0 3.83	. .	.29	6 21 46.84	— 63.44	
	10	α Canis Majoris	7.2	20.1	32.9	45.8	59.0	12.1	25.3	6 38 46.06	0.40	. .	.29	6 38 23.37	+ 8.96	
	11	ε Canis Majoris	16.3	50.6	44.5	58.8	13.1	27.2	42.0	6 52 58.93	— 0 0.49	. .	.29	6 52 36.25	7.79	
	12	δ Draconis, S. P.	13.3	46.8	19.3	52.0	24.5	56.3	29.2	7 12 51.63	+ 0 0.29	. .	.29	7 12 29.63	1.36	
	13	α^2 Geminorum	26.3	41.1	55.9	10.2	25.0	40.2	55.1	7 25 10.54	— 0 0.12	. .	.29	7 24 48.12	13.05	
	14	α Canis Minoris	1.0	13.7	26.1	38.8	51.0	4.0	16.9	7 31 38.79	.28	. .	.29	7 31 16.22	10.56	
	15	β Geminorum	34.9	49.4	3.3	17.2	31.3	46.0	0.6	7 36 17.53	.15	. .	.29	7 35 55.09	12.44	
	16	δ Cancri	40.7	54.0	7.0	20.1	33.4	46.8	0.2	8 36 20.31	.21	. .	.29	8 35 57.81	11.34	
	17	α^2 Cancri	48.8	3.0	15.5	28.1	41.1	53.8	7.0	8 50 28.19	.14	. .	.29	8 50 5.66	10.82	
	18	Moon, 1st L.	17.2	30.2	43.4	55.9	9.0	22.3	35.6	9 6 56.23	.25	+ 12.19	.29	9 7 35.87	. .	
	19	ξ Leonis	25.0	37.9	50.4	3.2	15.8	28.7	42.0	9 24 3.29	.24	. .	.29	9 23 40.76	+ 10.54	
10	20	Sun, 1st L.	8.1	20.9	33.4	45.8	58.6	11.1	3.7	23 21 45.94	.32	. .	.64	23 22 27.69	. .	K.
	21	Sun, 2d L.	17.6	30.3	42.8	55.2	7.8	20.6	33.3	23 23 55.37	.32					
	22	δ Ursæ Minoris, S. P.	..	..	44.0	15.0	..	..	46.0	6 24 35.00	2 25.85	. .	.64	6 21 46.51	— 63.80	
	23	ε Canis Majoris	..	..	44.8	59.0	13.1	27.8	42.2	6 53 13.32	0 14.74	. .	.64	6 52 35.94	+ 7.86	
	†24	Bessel's Zone, 511	..	..	27.0	43.8	1.2	18.3	35.6	6 58 1.18	17.12	. .	.64	6 57 21.42	14.36	
	†25	Bessel's Zone, 492	..	..	..	40.3	57.1	14.0	31.0	7 12 5.60	25.12	. .	.64	7 11 17.84	14.35	
	†26	Comet star	37.0	53.8	10.6	28.0	44.0	1.0	17.8	7 21 27.46	0.06	. .	.64	7 21 4.76	14.27	
	27	α^2 Geminorum	26.3	41.4	55.8	10.7	25.6	40.5	55.6	7 25 10.84	.13	. .	.64	7 24 48.02	13.07	
	28	α Canis Minoris	1.2	14.0	26.6	38.9	51.6	4.4	17.1	7 31 39.00	.28	. .	.64	7 31 16.08	10.57	
	29	β Geminorum	..	49.8	3.8	17.9	32.2	46.6	1.0	7 36 25.22	7.26	. .	.64	7 35 55.32	12.46	
	30	15 Argus	43.6	57.0	10.9	24.3	37.8	51.9	5.7	8 1 24.46	0.45	. .	.64	8 1 1.37	8.16	
	31	ε Hydræ	..	..	..	1.8	14.7	27.5	40.1	8 39 21.02	19.15	. .	.64	8 38 39.23	10.48	
	32	α Hydræ	..	..	14.0	26.4	39.0	51.8	4.8	9 20 39.20	12.96	. .	.64	9 20 3.60	9.39	
	33	ξ Leonis	25.3	38.0	50.8	3.5	16.3	29.2	42.3	9 24 3.63	0.24	. .	.64	9 23 40.75	10.56	
	34	ο Leonis	42.6	55.5	8.0	20.9	33.5	46.9	59.3	9 33 20.96	.25	. .	.64	9 32 58.07	10.48	
	35	ε Leonis	50.8	4.0	17.5	31.0	44.6	58.7	12.8	9 37 31.34	— 0 0.17	. .	.64	9 37 8.53	11.17	
	36	Anonymous	56.3	9.0	21.6	..	..	59.5	12.4	9 52 31.76	+ 0 2.20	. .	.64	9 52 11.32	10.22	
	37	Moon, 1st L.	57.8	10.8	23.7	36.3	49.2	2.3	15.2	9 54 36.47	— 0 0.27	+ 11.75	.64	9 55 15.31	. .	
	38	α Leonis	56.8	9.9	22.6	35.0	47.9	0.9	13.8	10 0 35.27	.24	. .	.64	10 0 12.39	10.39	
	39	ο Leonis	29.0	42.0	54.3	7.1	19.9	32.9	45.7	10 25 7.27	.25	. .	.64	10 24 44.38	10.18	
11	40	Sun, 1st L.	48.2	0.9	13.4	25.8	38.2	51.3	3.5	23 25 25.90	.32	. .	.26	23 26 8.15	. .	A
	41	Sun, 2d L.	57.8	10.5	23.0	35.4	48.1	0.8	13.4	23 27 35.57	— 0 0.32					
	42	α Cassiopeiæ	3.4	25.9	48.0	9.9	32.2	54.7	17.1	0 32 10 17	+ 0 0.08	. .	.26	0 31 47.99	13.47	
	43	Polaris	54.0	53.0	49.0	38.0	34.5	37.0	42.0	1 3 43.93	+ 0 7.80	. .	.26	1 3 29.47	88.78	
	44	Jupiter, 1st L.	27.1	40.2	52.9	5.8	18.5	31.7	44.8	2 29 5.86	— 0 0.23	+ 01.22	.26	2 28 43.37	. .	
	45	β Aurigæ	45.0	3.0	20.3	38.2	55.8	13.6	31.6	5 48 38.21	.03	. .	.26	5 48 15.92	+ 15.52	
	46	δ Ursæ Minoris, S. P.	37.3	10.5	42.7	14.5	43.0	12.5	42.8	6 22 11.90	3.83	. .	.26	6 21 45.81	— 64.16	
	47	α Canis Majoris	7.0	20.1	33.0	45.9	59.0	12.1	25.2	6 38 46.04	0.40	. .	.26	6 38 23.38	+ 9.00	
	48	Camelopardi, (2527)	7.0	37.5	7.4	37.3	7.7	38.2	8.5	7 31 37.66	.25	. .	.26	7 31 15.15	19.56	
12	49	Sun, 1st L.	28.9	41.6	33.9	6.6	19.0	31.8	44.5	23 29 6.61	.32	. .	.52	23 29 48.36	. .	
	50	Sun, 2d L.	38.1	50.7	3.4	15.7	28.1	40.8	53.7	23 31 15.79	.32					
13	51	Venus, 2d L.	..	..	..	42.8	55.1	7.8	20.7	22 19 1.60	19.09	— 01.84	.21	22 18 18.46	. .	
14	52	α Canis Majoris	6.7	19.9	32.9	45.8	58.7	11.7	25.0	6 38 45.81	— 0 0.40	. .	— 22.16	6 38 23.25	+ 9.06	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 4h.	H. Rate. 0s.
	s.	s.	s.	s.	
Mar. 7	—0.171	+0.237	—0.108	f 22.96	g .002
" 9	.203	.325	.108	22.29	.000
" 10	.203	.325	.108	22.64	.000
" 11	.203	.325	.108	22.26	.000
" 12	.203	.325	.108	22.49	l .006
" 13	.203	.325	.108	22.34	.006
" 14	.203	.325	.108	22.17	.006

24. Dec. 42° 58′ N.
25. " 41 35 N.
26. " 41 40 N.

TE. 16.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
14	1	δ Geminorum . . .	39.0	52.7	6.2	19.4	33.0	46.8	0.5	7 11 19.66	— 0 0.18	. .	— 22.15	7 10 57.33	+ 12.35	K.
	2	α² Geminorum . . .	26.0	40.8	55.8	10.1	25.0	40.0	55.0	7 25 10.39	.13	. .	.15	7 24 48.11	13.14	
	3	α Canis Minoris . . .	0.7	13.6	26.1	38.6	51.0	3.7	16.6	7 31 38.61	.18	. .	21.14	7 31 16.19	10.63	
	4	β Geminorum . . .	34.8	49.2	3.3	17.2	31.5	46.0	0.3	7 36 17.47	0.15	. .	.14	7 35 55.18	12.53	
	5	15 Argus	42.7	..	10.0	23.7	37.3	51.1	5.1	8 1 28.32	4.96	. .	.14	8 1 1.22	8.22	
	6	ε Hydræ	23.7	36.5	48.7	1.3	14.2	27.0	39.8	8 39 1.60	0.27	. .	.14	8 38 39.09	10.52	
17	7	Sun, 1st L. . . .	45.5	58.3	10.9	23.0	35.6	48.7	1.4	23 47 23.34	.32	. .	22.22	23 48 5.38	. .	A.
	8	Sun, 2d L.	55.1	7.3	20.1	32.2	45.1	57.5	10.2	23 49 32.50	.32					
	†9	κ Orionis	13.2	26.1	38.5	51.1	3.7	16.8	29.6	5 40 51.29	.36	. .	.37	5 40 28.56	+ 10.20	
	10	δ Ursæ Minoris, S. P. .	40.2	13.0	44.5	16.7	44.5	14.0	46.0	6 22 14.13	.36	. .	.40	6 21 51.37	— 66.45	
	11	α Canis Majoris . . .	6.9	20.0	33.0	46.1	59.1	12.2	25.4	6 38 46.10	.40	. .	.41	6 38 23.29	+ 9.12	
	12	δ Geminorum . . .	39.1	52.6	6.2	19.6	33.1	46.6	0.7	7 11 19.70	.18	. .	.43	7 10 57.09	12.41	
	13	α² Geminorum . . .	26.2	41.2	56.0	10.4	25.3	40.1	55.1	7 25 10.61	.13	. .	.43	7 24 48.05	13.22	
	14	β Geminorum . . .	35.2	49.4	3.3	17.7	31.9	46.1	0.5	7 30 17.73	.15	. .	.44	7 35 55.14	12.56	
18	15	Sun, 1st L. . . .	25.4	38.0	50.4	2.9	15.3	28.1	40.8	23 51 2.99	.31	. .	23.18	23 51 43.95	. .	K.
	16	Sun, 2d L.	34.1	47.0	59.3	11.8	24.3	37.1	49.7	23 53 11.90	.31					
	17	Mercury, 1st L. . .	4.0	16.8	29.7	42.1	54.6	7.4	20.2	0 36 42.11	— 0 0.29	+ 0.18	.21	0 36 18.79	. .	
	18	Polaris	58.0	57.0	46.0	..	37.0	..	39.0	1 0 35.40	+ 3 17.11	. .	.22	1 3 29.29	90.64	
	19	Jupiter, 1st L. . . .	54.3	..	20.1	..	45.8	..	11.8	2 34 33.00	— 0 0.23	. .	.27	2 34 10.59	. .	
	20	Jupiter, 2d L. . . .	..	9.4	..	35.0	..	1.1	..	2 34 35.18	.23					
	21	α Hydræ	49.3	2.0	14.7	27.2	39.9	52.6	5.2	9 20 27.27	.35	. .	.47	9 20 3.45	9.47	
	22	ϑ Ursæ Majoris . . .	..	..	37.2	57.3	18.0	38.8	59.4	9 23 18.14	20.42	. .	.47	9 22 34.25	13.29	
	23	ο Leonis	43.5	56.2	8.9	21.7	34.2	47.6	0.0	9 33 21.74	0.25	. .	.47	9 32 58.02	10.53	
	24	ε Leonis	50.6	4.7	18.2	31.9	45.7	59.4	13.6	9 37 32.01	.17	. .	.48	9 37 8.36	11.24	
19	25	Sun, 1st L. . . .	4.2	16.8	29.1	41.7	54.0	7.0	19.5	23 54 41.76	— 0 0.31	. .	.10	23 55 22.84	. .	A.
	†26	Sun, 2d L.	13.0	25.9	..	..	3.2	..	28.2	23 56 47.57	+ 0 2.86					
20	27	Venus, 2d L. . . .	4.7	17.5	29.9	42.2	55.0	7.4	20.1	22 14 42.40	— 0 0.33	— 1.68	.14	22 14 17.25	. .	
21	28	Sun, 1st L. . . .	20.5	33.1	45.6	57.9	10.5	22.8	35.9	0 1 58.04	.31	. .	.16	0 2 39.08	. .	
	29	Sun, 2d L.	29.5	42.1	54.5	6.9	19.4	32.1	44.9	0 4 7.06	.31					
	30	κ Orionis	14.0	26.8	39.3	51.9	4.3	17.2	30.1	5 40 51.94	.36	. .	.16	5 40 28.42	10.28	
	31	α Orionis	47.0	49.9	2.1	14.4	27.2	40.0	53.0	5 47 14.86	.27	. .	.16	5 46 51.43	+ 11.66	
	32	δ Ursæ Minoris, S. P. .	45.0	18.0	50.5	21.7	50.5	18.8	49.8	6 22 19.19	3.83	. .	.16	6 21 52.20	— 67.77	
	33	α Canis Majoris . . .	7.6	20.8	33.8	46.8	59.9	13.0	26.2	6 38 46.87	0.40	. .	.16	6 38 23.31	+ 9.21	
	34	α² Geminorum . . .	27.0	41.6	56.3	11.0	25.9	40.9	55.8	7 25 11.21	.13	. .	.16	7 24 47.92	13.30	
	35	α Canis Minoris . . .	1.8	14.3	27.0	39.2	51.8	4.8	17.2	7 31 39.44	.28	. .	.16	7 31 16.00	10.75	
	36	β Geminorum . . .	35.7	50.1	4.2	18.1	32.3	46.9	1.3	7 36 18.37	.15	. .	.16	7 35 55.06	12.64	
	37	ε Hydræ	24.9	37.4	50.0	2.4	14.9	28.0	40.4	8 38 2.57	.27	. .	.16	8 38 39.14	10.61	
24	38	Venus, 2d L. . . .	14.1	26.9	39.3	51.8	4.4	17.2	29.8	22 15 51.93	.33	— 1.58	24.42	22 15 25.60	. .	K.
25	39	Sun, 1st L. . . .	54.8	7.5	19.8	32.4	44.9	57.8	10.2	0 16 32.46	.30	. .	.44	0 17 12.07	. .	
	40	Sun, 2d L.	3.3	16.1	28.5	41.1	53.7	6.2	19.1	0 18 41.16	— 0 0.30					
	41	Mercury, 1st L. . .	5.8	18.7	31.5	..	..	9.8	22.7	1 19 41.70	+ 0 2.40	+ 0.21	.45	1 19 19.86	. .	
	42	ν Orionis	34.0	47.1	59.9	12.8	25.8	38.7	52.0	5 59 12.90	— 0 0.23	. .	.50	5 58 48.17	12.32	
	43	μ Geminorum . . .	24.2	37.8	51.3	4.7	18.3	31.9	45.7	6 14 4.84	— 0 0.18	. .	.50	6 13 40.16	+ 12.99	
	44	δ Ursæ Minoris, S. P. .	..	..	51.5	23.0	..	..	..	6 20 37.25	+ 1 39.32	. .	.50	6 21 52.07	— 69.21	
26	†45	Sun, 1st L. . . .	19.5	32.1	44.9	57.4	9.9	22.3	34.9	0 19 57.27	— 0 0.30	. .	.06	0 20 43.58	. .	A.
	†46	Sun, 2d L.	40.8	53.4	6.1	18.4	31.2	44.0	56.4	0 22 18.61	— 0 0.30					
	†47	Polaris	53.0	53.0	46.5	38.8	33.0	..	..	0 55 44.86	+ 8 4.83	. .	.06	1 3 25.63	+ 92.28	
	48	κ Orionis	14.8	27.6	40.3	52.8	5.7	18.5	31.3	5 40 53.00	— 0 0.36	. .	.42	5 40 28.22	10.37	K.
	49	α Orionis	37.9	50.7	3.3	15.8	28.4	41.2	54.0	5 47 15.90	.27	. .	.42	5 46 51.21	11.76	
	50	15 Argus	44.7	58.7	12.1	25.7	39.6	53.2	7.2	8 1 25.89	.45	. .	.42	8 1 1.02	8.44	
	51	ε Hydræ	26.0	38.2	51.0	3.7	16.2	28.9	41.7	8 39 3.67	.27	. .	.42	8 38 38.98	10.68	
	52	ι Ursæ Majoris . . .	8.2	27.4	46.1	4.8	23.8	43.0	2.4	8 49 5.10	— 0 0.00	. .	— 24.42	8 48 40.68	+ 13.97	

Mar. 24. Examined collimation by reflection.
9. Mar. 17. Field illumination through the axis from this date.
26. Passing clouds.
45, 46, 47, +0s.36 applied to correction for clock on account of personal equation.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 4h.	0s.
	s.	s.	s.	s.	
Mar. 14	—0.203	+0.325	—0.108	f 22.17	l .006
" 17	.203	.325	.108	22.34	g .030
" 18	.203	.325	.108	23.31	.030
" 19	.203	.325	.108	23.10	.001
" 20	.203	.325	.108	23.10	.001
" 21	.203	.325	.108	23.15	.001
" 24	.203	.325	.108	24.24	.010
" 25	.203	.325	.108	24.48	g .010
" 26	.203	.325	.108	24.42	.000

APPARENT RIGHT ASCENSIONS OBSERVED WITH THE WEST TRANSIT INSTRUMENT.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
April 21	1	Sun, 1st L.	50.0	3.0	16.4	28.9	41.2	54.1	7.1	1 55 28.67	− 0 0.09	} . .	− 24.10	1 56 9.79	. .	A.
	2	Sun, 2d L.	0.6	13.4	26.7	39.5	52.2	4.9	17.7	1 57 39.30	.09					
	3	ρ Leonis	30.1	43.0	55.6	8.5	21.0	33.8	46.2	10 25 8.31	.10	. .	.26	10 24 43.95	+ 10.50	
	4	Leonis, (3768) . .	25.2	38.0	50.5	3.0	15.5	28.0	40.7	10 53 2.99	.14	. .	.27	10 52 38.58	10.11	
	5	δ Leonis	40.8	54.3	7.9	21.4	34.7	47.9	1.3	11 6 21.19	.02	. .	.27	11 5 56.90	10.50	
	6	δ Hydræ et Crateris .	26.8	39.9	52.8	6.0	18.7	31.1	44.1	11 12 5.63	− 0 0.24	. .	.27	11 11 41.12	9.47	
	7	λ Draconis	47.0	24.2	1.4	38.3	15.0	51.4	28.7	11 22 38.00	+ 0 1.02	. .	.28	11 22 14.74	11.40	
	8	β Leonis	59.4	12.8	26.0	39.1	51.9	4.4	17.8	11 41 38.77	− 0 0.06	. .	.28	11 41 14.43	9.82	
	9	γ Ursæ Majoris . . .	3.4	25.4	47.2	8.9	30.2	51.8	13.4	11 46 8.61	+ 0 0.42	. .	.28	11 45 44.75	10.13	
	10	δ Ursæ Majoris . . .	2.0	25.9	49.8	13.3	36.7	0.1	23.9	12 8 13.10	+ 0 0.50	. .	.29	12 7 49.31	9.29	
	11	β Corvi	5.1	18.9	32.5	46.1	59.5	13.0	26.5	12 26 45.94	− 0 0.29	. .	.29	12 26 21.36	9.54	
	12	γ Virginis	40.9	53.4	6.1	18.9	31.0	43.9	56.1	12 34 18.61	0.16	. .	.30	12 33 54.15	9.49	
	13	Polaris, S. P. . . .	28.0	26.5	19.0	7.5	3.5	4.5	3.0	13 4 13.14	17.84	. .	.31	13 3 30.99	90.31	
	14	α Virginis	54.1	7.0	19.9	32.8	45.1	57.9	10.4	13 17 32.46	0.22	. .	.31	13 17 7.93	9.72	
22	15	Sun, 1st L.	35.0	48.1	1.2	13.9	26.7	39.2	52.3	1 59 13.77	.08	} . .	.77	1 59 54.21	. .	K
	16	Sun, 2d L.	45.5	58.6	11.7	24.5	37.2	50.1	2.7	2 1 24.36	.08					
	17	α Ursæ Majoris . . .	15.6	43.1	10.2	37.3	4.5	31.4	58.5	10 54 37.23	+ 0 0.66	. . .	.85	10 54 13.04	12.38	
	18	δ Hydræ et Crateris .	27.4	40.6	53.6	6.3	19.2	31.9	44.8	11 12 6.26	− 0 0.19	. .	.85	11 11 41.22	9.48	
	19	β Leonis	..	..	26.4	39.6	52.3	5.2	18.3	11 41 52.36	13.07	. .	.86	11 41 14.43	9.83	
	20	Polaris, S. P. . . .	..	..	..	5.0	2.0	..	3.0	13 14 43.33	−10 49.85	. .	.87	13 3 28.61	90.01	
	21	12 Can. Ven.	..	..	0.0	16.2	32.0	48.2	4.6	12 49 32.20	0 16.03	. .	.87	12 48 51.30	8.73	
23	22	Sun, 1st L.	19.0	32.1	45.2	57.8	10.9	23.8	36.5	2 2 57.90	0.08	} . .	.56	2 3 38.79	. .	A
	23	Sun, 2d L.	30.2	43.4	56.5	9.0	21.9	34.4	47.4	2 5 8.97	− 0 0.08					
	24	α Ursæ Majoris . . .	15.2	42.7	10.1	37.5	4.3	31.2	58.8	10 54 37.11	+ 0 0.66	. .	.60	10 54 13.17	12.41	
	25	Leonis, (3832) . .	42.1	54.9	7.4	19.8	32.1	44.8	57.2	11 6 19.76	− 0 0.15	. .	.61	11 5 55.00	9.99	
	26	λ Draconis	47.1	24.6	2.0	38.9	15.4	52.2	29.1	11 22 38.47	+ 0 1.02	. .	.61	11 22 14.88	11.47	
	27	β Virginis	30.0	42.7	55.4	8.0	20.2	32.5	45.3	11 43 7.73	− 0 0.14	. .	.61	11 42 42.98	9.98	
	28	δ Ursæ Majoris . . .	2.6	26.6	50.1	13.8	37.1	0.5	24.1	12 8 13.54	+ 0 0.51	. .	.61	12 7 49.44	9.30	
	†29	η Virginis	51.3	4.0	17.0	29.3	41.4	54.0	6.5	12 12 29.07	− 0 0.16	. .	.61	12 12 4.30	9.66	
	30	β Corvi	5.4	19.1	33.0	46.3	0.0	13.3	27.1	12 26 46.31	0.29	. .	.61	12 26 21.41	9.55	
	31	γ Virginis	41.2	54.0	6.5	19.1	31.6	44.0	56.7	12 34 19.01	0.15	. .	.61	12 33 54.25	9.49	
	32	Polaris, S. P. . . .	29.0	27.5	17.5	9.5	2.0	3.0	7.5	13 4 15.14	17.84	. .	.62	13 3 32.68	89.66	
	33	α Virginis	54.6	7.5	20.2	33.0	45.8	58.1	11.1	13 17 32.90	0.22	. .	.62	13 17 8.06	9.71	
	34	η Bootis	8.4	21.7	35.1	48.5	1.3	14.9	28.1	13 47 48.29	− 0 0.04	. .	.62	13 47 23.63	8.84	
	35	α Draconis	10.8	40.9	10.8	40.6	10.2	39.5	9.5	14 0 40.33	+ 0 0.77	. .	.62	14 0 16.48	3.52	
	36	α Bootis	25.5	38.8	52.2	5.5	19.0	32.1	45.2	14 9 5.47	− 0 0.03	. .	.62	14 8 40.82	8.34	
24	37	Sun, 1st L.	..	17.5	30.0	43.5	..	..	..	2 6 30.37	+ 0 12.70	} . .	.57	2 7 24.11	. .	
	38	Sun, 2d L.	..	..	..	..	7.2	20.0	33.0	2 9 20.07	− 0 25.78					
	39	Venus, 2d L. . . .	32.7	45.2	58.0	10.7	53.0	35.6	48.3	23 23 10.50	− 0 0.17	− 0.97	.59	23 22 44.77	. .	
25	40	Sun, 1st L.	50.0	3.0	..	..	..	..	..	2 9 56.50	+ 0 32.36	+ 65.53	.90	2 11 9.49	. .	
	41	Sun, 1st Cusp. . . .	..	..	..	..	..	2.8	17.7	2 11 10.25						
	42	Sun, 2d Cusp. . . .	..	14.0	27.1	40.1	52.9	50.4	18.6	2 12 46.53						
	43	δ Leonis	..	..	..	..	..	..	2.1	11 7 2.10	− 0 40.32	. .	.88	11 5 56.90	10.54	
	44	δ Hydræ et Crateris .	27.4	40.4	..	6.3	19.1	31.9	44.8	11 12 8.32	− 0 2.37	. .	.88	11 11 41.07	9.51	
	45	Draconis, (3906) . .	41.8	12.0	43.0	12.9	41.9	10.5	40.8	11 21 11.84	+ 0 3.28	. .	.88	11 20 50.24	13.47	
	46	β Leonis	0.1	13.3	26.6	39.5	52.3	5.2	18.1	11 41 39.30	− 0 0.06	. .	.88	11 41 14.36	9.86	
	47	β Corvi	5.7	19.4	33.0	46.7	0.1	..	..	12 26 32.98	+ 0 13.23	. .	.88	12 26 21.33	9.56	
	48	Polaris, S. P. . . .	27.0	27.0	18.0	..	59.0	58.0	..	12 59 25.80	+ 4 27.36	. .	.87	13 3 28.29	88.87	
	49	α Virginis	54.8	7.7	20.7	33.4	45.9	58.4	11.3	13 17 33.17	− 0 0.22	. .	.87	13 17 8.08	9.71	
	†50	Sun, 2d L.	34.0	46.9	0.1	13.1	25.8	38.5	51.6	2 20 12.86	.08	. .	.15	2 19 48.63	. .	
	†51	Jupiter, 1st L. . . .	2.2	15.5	28.9	42.0	55.0	8.1	21.0	3 9 41.81	− 0 0.05	+ 1.16	− 24.14	3 9 18.78	. .	

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 10h.	0s.
	s.	s.	s.	s.	
Apr. 20	−0.280	+0.344	+0.120	f 24.25	g .019
" 21	.280	.344	.120	24.84	.009
" 22	.280	.344	.120	24.60	.005
" 23	.280	.344	.120	24.58	g .001
" 24	−0.280	+0.344	+0.120	24.88	l .002

29. Indistinct.
April 25. Sun partially eclipsed.
50, 51, +0s.36 applied to correction for clock error.
51. Jupiter indistinct.

E. 6.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
27	†1	α Andromedæ	8.2	22.5	37.0	51.2	5.2	19.2	33.4	0 0 50.96	+ 0 0.04	. .	− 24.54	0 0 26.46	+ 11.69	A.
	†2	Polaris	43.5	48.0	47.0	45.5	30.5	23.5	25.0	1 3 38.14	+ 0 17.28	. .	.54	1 3 30.88	88.73	
	†3	Moon, 1st L.	59.8	13.3	27.0	40.5	53.3	7.2	20.5	4 3 40.23	− 0 0.04	67.50	.14	4 4 23.55	. .	
	4	α Hydræ	49.6	2.4	14.9	27.7	40.2	52.8	5.5	9 20 27.58	0.21	. .	.49	9 20 2.88	+ 10.02	K.
	5	ϑ Ursæ Majoris	..	..	..	57.7	17.8	38.1	58.9	9 23 28.12	30.39	. .	.49	9 22 33.24	14.21	
	6	ε Leonis	..	4.6	18.7	32.5	46.1	59.8	13.7	9 37 39.23	− 0 6.89	. .	.49	9 37 7.85	11.78	
	7	α Ursæ Majoris	14.9	42.5	9.7	36.9	3.9	30.9	58.2	10 54 36.71	+ 0 0.66	. .	.49	10 54 12.88	12.54	
	8	δ Leonis	40.7	54.4	8.2	21.6	34.8	48.0	1.8	11 6 21.36	− 0 0.02	. .	.49	11 5 56.85	10.57	
	9	δ Hydræ et Crat.	..	40.2	53.0	5.9	18.5	31.4	44.6	11 12 12.27	6.71	. .	.49	11 11 41.07	9.52	
	10	γ Cephei, S. P.	..	41.8	35.9	30.0	24.9	20.0	15.1	11 33 57.95	− 0 29.60	. .	.49	11 33 3.86	10.29	
29	11	Polaris	50.0	48.0	50.0	..	..	..	..	0 47 49.33	+16 7.24	. .	.02	1 3 32.55	88.05	
30	12	Sun, 1st L.	..	57.8	10.9	23.8	36.8	49.6	2.7	2 29 30.27	− 0 0.58	. .	23.54	2 30 8.73	. .	
	13	Sun, 2d L.	56.6	9.3	22.4	35.6	48.6	1.3	14.3	2 31 35.44	.58					
1	14	Sun, 1st L.	32.8	45.9	59.2	12.3	25.1	37.8	51.9	2 33 12.14	.07	. .	.08	2 33 54.65	. .	
	15	Sun, 2d L.	44.4	57.8	11.0	23.7	36.8	49.7	2.8	2 35 23.46	.07					
2	16	Sun, 1st L.	21.5	34.6	47.7	0.9	13.7	26.7	39.6	2 37 0.67	.07	. .	22.62	2 37 43.92	. .	
	17	Sun, 2d L.	33.3	46.7	59.7	12.7	25.4	38.3	51.8	2 39 12.56	.07					
	18	Polaris, S. P.	29.0	29.0	19.0	9.0	2.0	4.0	4.0	13 4 13.71	17.86	. .	.42	13 3 33.43	85.93	
	19	α Virginis	52.3	5.3	18.1	30.8	43.4	56.0	8.8	13 17 30.67	.22	. .	.42	13 17 8.03	9.69	
	20	η Bootis	6.3	19.5	33.0	46.4	59.4	12.6	25.8	13 47 46.14	.04	. .	.41	13 47 23.69	8.81	
	21	α Bootis	23.3	36.8	50.0	3.3	16.7	30.0	43.3	14 9 3.34	− 0 0.03	. .	.40	14 8 40.91	8.30	
3	22	Polaris	50.0	51.0	50.0	44.0	33.0	26.0	24.0	1 3 39.71	+ 0 17.30	. .	.19	1 3 34.82	85.38	
4	23	Sun, 1st L.	..	..	26.8	39.8	52.8	5.8	19.1	2 44 52.86	− 0 13.15	. .	21.67	2 45 24.15	. .	
	24	Sun, 2d L.	12.7	25.8	39.2	52.0	5.1	17.9	31.3	2 46 52.00	0.06					
	25	δ Leonis	37.8	51.4	4.9	18.6	31.7	45.0	58.8	11 6 18.31	.02	. .	.51	11 5 56.78	10.65	
	26	δ Hydræ et Crat.	24.0	37.0	49.9	2.9	15.7	28.4	41.5	11 12 2.77	.24	. .	.51	11 11 41.02	9.59	
	27	Dec. +66° 8′ S. P.	..	..	..	..	..	..	55.0	11 17 55.00	1 44.39	. .	.51	11 15 40.10	9.30	
	28	Dec. +66 8 S. P.	..	29.8	0.3	30.9	1.8	32.8	4.0	11 19 46.60	0 16.81	. .	.51	11 19 8.28	9.48	
	29	Dec. +63 2 S. P.	41.1	8.8	36.0	3.3	30.9	59.0	26.6	11 41 3.67	1.24	. .	.50	11 40 40.93	10.91	
	30	β Corvi	..	..	29.6	43.0	56.8	10.0	23.8	12 26 56.64	13.87	. .	.48	12 26 21.29	9.59	
	31	Polaris, S. P.	29.5	30.0	18.5	10.0	5.0	5.5	7.0	13 4 15.07	17.86	. .	.47	13 3 35.74	85.19	
	32	α Virginis	..	..	17.0	29.9	42.5	55.1	7.8	13 17 42.46	− 0 12.97	. .	.47	13 17 8.02	9.70	
	33	α Lyræ	18.7	34.8	51.1	6.9	22.7	38.7	54.8	18 32 6.81	+ 0 0.16	. .	.37	18 31 45.60	5.97	
5	34	Sun, 1st L.	50.5	3.8	17.2	30.2	43.0	56.3	9.3	2 48 30.04	− 0 0.06	. .	.56	2 49 14.61	. .	
	35	Sun, 2d L.	3.1	16.3	29.4	42.5	55.6	8.4	21.7	2 50 42.43	0.06					
6	36	Sun, 1st L.	..	..	..	20.9	34.1	..	..	2 52 27.50	6.68	. .	.42	2 53 5.69	. .	
	37	Sun, 2d L.	..	..	..	..	..	59.6	12.7	2 55 6.15	32.75					
11	38	Sun, 1st L.	6.1	19.4	32.8	46.0	59.1	12.0	25.2	3 11 45.80	0.04	. .	20.82	3 12 31.75	. .	A.
	39	Sun, 2d L.	19.6	33.1	46.4	59.6	12.7	25.4	39.2	3 13 59.43	0.04					
	40	β Leonis	56.2	9.3	22.2	35.5	48.4	1.1	14.1	11 41 35.26	.07	. .	21.01	11 41 14.18	10.00	
	41	β Cassiopeiæ, S. P.	10.8	34.8	58.4	22.2	46.0	10.0	34.0	12 1 22.31	− 0 1.06	. .	.10	12 1 0.15	11.57	
	42	δ Ursæ Majoris	58.6	22.4	46.0	9.3	33.0	56.2	20.0	12 8 9.36	+ 0 0.51	. .	.02	12 7 48.85	9.65	
	43	β Corvi	1.5	15.6	29.1	42.8	56.1	9.3	23.1	12 26 42.50	− 0 0.29	. .	.02	12 26 21.19	9.64	
	44	γ Virginis	37.6	50.2	2.7	15.4	27.4	40.1	52.8	12 34 15.17	0.16	. .	.03	12 33 53.98	9.57	
	45	Polaris, S. P.	35.0	35.5	27.0	16.0	11.0	9.5	10.0	13 4 20.57	17.86	. .	.04	13 3 41.67	81.78	
	46	α Virginis	51.0	3.8	16.7	29.5	42.0	54.8	7.5	13 17 29.33	− 0 0.22	. .	.04	13 17 8.07	9.71	
	47	η Ursæ Majoris	52.2	12.1	31.9	51.1	10.8	30.1	49.8	13 41 51.14	+ 0 0.32	. .	.05	13 41 30.41	7.01	
	48	η Bootis	4.9	18.1	31.6	45.0	58.1	11.1	24.4	13 47 44.74	− 0 0.04	. .	.05	13 47 23.65	8.81	
	49	α Bootis	21.9	35.0	48.8	2.1	15.0	28.2	42.0	14 9 1.86	.03	. .	.06	14 8 40.77	8.29	
	50	β Libræ	29.4	42.8	55.1	8.0	20.5	33.1	46.0	15 9 7.84	.21	. .	.08	15 8 46.55	9.75	
	51	γ¹ Libræ	40.8	53.8	6.9	19.8	32.6	45.2	58.5	15 27 19.66	.25	. .	.09	15 26 58.32	10.13	
	52	α Serpentis	27.0	40.0	52.4	5.1	17.7	30.1	42.9	15 37 5.10	− 0 0.12	. .	− 21.09	15 36 43.89	+ 8.91	

1, 2 & 3.+0s.36 applied to correction for clock error.

DATE.	VALUE OF m.	n.	c.	CLOCK. At 10h.	H. Rate. 0s.
	s.	s.	s.	s.	
April 27	−0.280	+0.344	+0.120	f 24.49	l .002
" 29	.280	.344	.120	23.86	.019
" 30	.280	.344	.120	23.40	.019
May 1	.280	.344	.120	22.94	.019
" 2	.280	.344	.120	22.48	.019
" 3	.280	.344	.120	22.02	.019
" 4	.280	.344	.120	21.53	.019
" 5	.280	.344	.120	21.47	.012
" 6	.280	.344	.120	21.33	.012
" 11	−0.280	+0.344	+0.120	20.97	g .022

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
May 11	1	χ Lupi	51.1	6.4	21.7	36.5	51.1	6.1	21.2	15 41 36.30	— 0 0.36	. .	— 21.10	15 41 14.84	+ 11.35	A
	2	δ Scorpii	58.1	11.8	25.5	39.0	52.1	5.8	19.3	15 51 38.80	.29	. .	.10	15 51 17.41	10.71	
	3	β¹ Scorpii	14.0	27.4	41.0	54.2	7.1	20.6	33.4	15 56 53.96	.27	. .	.10	15 56 32.59	10.54	
	4	Moon, 2d L. . . .	9.0	22.6	36.6	50.0	3.7	17.0	31.1	16 10 50.00	0.27	— 70.20	.11	17 9 18.42	. .	
	5	α Scorpii	..	55.4	9.2	23.2	37.1	50.9	5.0	16 20 30.13	7.30	. .	.11	16 20 1.72	11.13	
	6	τ Scorpii	0.2	14.8	29.1	43.2	57.4	11.2	25.7	16 26 43.09	— 0 0.33	. .	.11	16 26 21.65	11.33	
	†7	Polaris	54.0	57.0	52.0	49.0	38.0	26.0	29.0	1 3 43.57	+ 0 17.30	. .	.66	1 3 39.21	81.16	K
12	8	Sun, 1st L. . . .	..	..	..	41.8	54.7	7.6	21.2	3 16 1.07	— 0 19.59	. .	.69	3 16 26.61	. .	
	9	Sun, 2d L. . . .	15.4	28.8	42.1	55.4	8.5	21.3	34.7	3 17 55.17	— 0 0.04					
	10	ι Aurigæ	35.6	50.8	6.0	20.8	35.6	50.4	5.6	4 47 20.69	+ 0 0.08	. .	.73	4 46 59.04	14.85	
	11	α Aurigæ	47.2	5.5	23.3	41.7	59.4	17.1	35.3	5 5 41.36	.25	. .	.73	5 5 19.88	16.92	
	12	Dec. +66° 8′ S. P.	59.8	30.5	0.9	31.7	2.8	33.9	4.9	11 19 32.07	+ 0 0.81	. .	.87	11 19 11.01	9.04	
	13	Dec. +62 56 S. P.	..	..	..	..	32.0	0.0	28.2	11 34 0.06	— 0 56.19	. .	.88	11 32 41.99	9.96	
	14	Dec. +63 1 S. P.	..	9.8	37.1	4.4	31.6	..	..	11 40 50.71	+ 0 12.63	. .	.88	11 40 41.46	10.35	
	15	Dec. +62 56 S. P.	..	..	51.8	19.2	46.4	..	..	11 43 19.13	— 0 0.95	. .	.88	11 42 56.30	10.46	
	16	Dec. +63 11 S. P.	..	..	..	..	21.0	49.0	17.0	11 44 49.00	56.73	. .	.88	11 43 30.39	10.49	
	17	Polaris, S. P. . . .	37.0	36.0	25.0	14.0	6.0	7.0	7.0	13 4 18.86	— 0 17.86	. .	.91	13 3 39.09	80.87	
	18	α Virginis	51.9	5.0	17.6	..	43.0	..	8.3	13 17 25.16	+ 0 4.87	. .	.91	13 17 8.12	9.71	
	19	η Bootis	5.7	19.1	32.7	46.0	58.9	12.0	25.3	13 47 45.67	— 0 0.04	. .	.92	13 47 23.71	8.81	
	20	α Bootis	22.8	36.4	49.7	2.9	16.2	29.5	42.9	14 9 2.91	— 0 0.03	. .	.93	14 8 40.95	8.29	
	21	ε Bootis	57.7	12.0	26.4	40.4	54.4	8.4	22.7	14 38 40.29	+ 0 0.04	. .	.94	14 38 18.39	7.83	
	22	α² Libræ	9.2	21.9	34.7	47.6	0.6	13.4	26.3	14 42 47.67	— 0 0.24	. .	.94	14 42 25.49	9.99	
	23	β Libræ	30.7	43.4	56.2	9.0	21.5	33.9	46.7	15 9 8.77	0.21	. .	.95	15 8 46.61	9.75	
	24	α Scorpii	..	..	10.4	24.2	38.3	51.9	6.0	16 20 38.16	14.28	. .	.98	16 20 1.90	11.11	
	25	τ Scorpii	1.5	16.0	30.0	44.4	58.2	12.4	26.7	16 26 44.17	0.33	. .	.98	16 26 21.86	11.31	
	26	Moon, 2d L. . . .	0.1	15.1	29.0	42.7	56.1	9.9	23.7	17 12 42.37	.28	— 71.18	22.00	17 11 8.91	. .	
	27	Ophiuchi, (5987) . .	57.1	10.9	24.6	38.0	51.3	4.7	18.4	17 34 37.86	.29	. .	.01	17 34 15.56	11.16	
13	28	Sun, 1st L. . . .	57.0	10.2	23.6	36.8	49.9	3.0	16.3	3 19 36.69	.04	. .	21.65	3 20 22.00	. .	A
	29	Sun, 2d L. . . .	10.8	24.2	37.8	51.0	3.9	17.0	30.2	3 21 50.70	.04					
	30	β Virginis	27.0	39.7	52.2	4.8	17.1	29.7	42.1	11 43 4.66	— 0 0.15	. .	.78	11 42 42.73	10.16	
	31	δ Ursæ Majoris . . .	59.5	23.2	47.1	10.7	33.9	57.2	21.1	12 8 10.39	+ 0 0.50	. .	.78	12 7 49.11	9.74	
	32	η Virginis	48.4	1.1	13.8	26.1	38.6	51.1	3.8	12 12 26.13	— 0 0.16	. .	.78	12 12 4.19	9.78	
	33	β Corvi	2.5	16.1	29.9	43.4	56.9	10.2	24.0	12 26 43.29	.01	. .	.79	12 26 21.49	9.65	
	34	γ Virginis	38.2	51.1	3.8	16.0	28.6	40.9	53.5	12 34 16.01	— 0 0.17	. .	.79	12 33 54.05	9.57	
	35	Polaris, S. P. . . .	34.0	33.5	22.0	14.0	..	6.5	5.0	13 2 59.17	+ 1 0.29	. .	.79	13 3 37.67	80.46	
	36	α Virginis	51.9	4.5	17.3	30.0	42.8	55.2	8.2	13 17 30.00	— 0 0.22	. .	.79	13 17 7.98	9.71	
	37	m Virginis	19.0	31.6	44.4	57.0	9.7	22.1	34.8	13 33 56.94	— 0 0.21	. .	.80	13 33 34.93	9.64	
	38	α Draconis	7.5	37.6	7.9	37.4	6.9	36.2	6.4	14 0 37.13	+ 0 0.77	. .	.81	14 0 16.09	3.69	
	39	α Bootis	22.5	36.1	49.5	2.7	16.0	29.1	42.5	14 9 2.69	— 0 0.03	. .	.81	14 8 40.85	8.29	
14	40	Sun, 1st L. . . .	53.4	6.8	20.3	33.4	46.7	59.9	13.2	3 23 33.39	.04	. .	22.11	3 24 18.21	. .	
	41	Sun, 2d L. . . .	7.3	20.8	34.2	47.4	0.7	13.8	27.1	3 25 47.33	.04					
18	42	Sun, 1st L. . . .	43.5	56.8	10.7	23.9	36.9	50.2	3.6	3 39 23.66	.04	. .	23.20	3 40 7.70	. .	
	43	Sun, 2d L. . . .	58.0	11.6	25.1	38.3	51.6	4.7	18.3	3 41 38.23	0.04					
	44	Polaris, S. P. . . .	..	..	..	20.0	..	..	..	13 4 20.00	12.56	. .	.22	13 3 44.22	77.69	
	45	α Virginis	53.3	6.2	19.0	31.7	44.2	56.8	9.8	13 17 31.57	— 0 0.22	. .	.22	13 17 8.13	9.73	
	46	η Ursæ Majoris . . .	54.7	14.6	34.0	..	..	..	..	13 41 14.43	+ 0 39.34	. .	.22	13 41 30.55	7.09	
	47	α Bootis	24.0	..	50.9	4.1	17.6	30.8	44.0	14 9 8.57	— 0 4.48	. .	.22	14 8 40.87	+ 8.29	
	48	β Ursæ Minoris . . .	14.5	3.8	51.0	39.0	26.2	13.3	1.7	14 51 38.50	+ 0 1.44	. .	.22	14 51 16.72	— 4.42	
	49	α Serpentis	29.3	42.0	55.0	7.8	20.1	32.4	45.3	15 37 7.41	— 0 0.12	. .	.22	15 36 44.07	+ 8.84	
	50	ζ Ursæ Minoris . . .	1.0	3.5	5.0	6.6	7.5	9.4	11.0	15 50 6.29	+ 0 1.96	. .	.22	15 49 45.03	— 13.23	
	51	β¹ Scorpii	16.4	29.9	43.3	56.4	9.5	22.8	36.0	15 56 56.33	— 0 0.28	. .	.22	15 56 32.83	+ 10.45	
	52	δ Ophiuchi	5.4	18.1	30.9	43.4	56.0	8.2	21.0	16 6 43.29	— 0 0.18	. .	— 23.22	16 6 19.89	+ 9.44	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 11h.	H. Rate. 0s.
	s.	s.	s.	s.	
May 11	—0.280	+0.344	+0.120	f 20.90	g .022
" 12	.280	.344	.120	21.86	.022
" 13	.280	.344	.120	21.76	.015
" 14	.280	.344	.120	22.22	.015
" 18	—0.280	+0.344	+0.120	23.21	.002

7. —0s.36 applied to correction for clock error.

E.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
18	1	α Scorpii	43.6	57.8	12.0	25.7	39.4	53.3	7.3	16 20 25.59	— 0 0.32	. .	— 23.22	16 20 2.05	+ 11.02	K.
	2	δ Ursæ Minoris	..	..	..	..	58.0	28.0	..	18 27 43.00	57.53	. .	.23	18 22 12.24	— 85.44	
	3	α Lyræ	..	37.0	53.2	9.3	25.3	41.3	57.4	18 32 17.25	7.89	. .	.23	18 31 46.13	+ 5.60	
19	4	Sun, 1st L.	41.8	55.3	9.0	21.9	35.2	48.5	2.1	3 43 21.97	0.03	. .	22.89	3 44 6.54	. .	A.
	5	Sun, 2d L.	56.9	10.1	24.0	37.1	50.2	3.4	17.0	3 45 36.96	.03					
	6	β Leonis	58.0	11.1	24.2	37.2	50.2	3.0	16.1	11 41 37.11	— 0 0.06	. .	.90	11 41 14.15	10.09	
	7	γ Ursæ Majoris	2.0	23.5	45.7	7.1	28.2	49.9	11.5	11 46 6.84	+ 0 0.42	. .	.90	11 45 44.36	10.71	
	8	δ Ursæ Majoris	0.6	24.2	48.2	11.6	35.0	58.2	22.0	12 8 11.40	+ 0 0.51	. .	.90	12 7 49.01	9.86	
	9	β Corvi	3.3	17.2	31.0	44.2	58.0	11.2	25.0	12 26 44.27	— 0 0.29	. .	.90	12 26 21.08	9.70	
	10	γ Virginis	39.2	52.1	4.9	17.0	29.6	41.9	54.8	12 34 17.07	0.16	. .	.91	12 33 54.00	9.61	
	11	Polaris, S. P.	38.5	39.0	27.5	17.5	15.0	9.5	13.0	13 4 22.86	17.86	. .	.91	13 3 42.09	77.14	
	12	α Virginis	52.8	5.3	18.4	31.4	43.5	56.2	9.1	13 17 30.96	0.22	. .	.91	13 17 7.83	9.73	
	13	η Bootis	6.8	20.1	33.3	46.8	59.9	12.9	26.1	13 47 46.56	0.04	. .	.91	13 47 23.61	8.83	
	†14	Polaris	..	..	..	53.0	42.5	32.0	31.5	1 15 39.75	11 34.56	. .	23.29	1 3 41.90	76.83	K.
	†15	α Persei	..	..	..	..	..	23.2	42.7	3 14 32.95	47.59	. .	.30	3 13 22.06	16.13	
20	16	Sun, 1st L.	..	..	8.3	22.0	35.3	48.4	1.9	3 49 35.18	13.33	. .	.14	3 50 6.15	. .	
	17	Sun, 2d L.	56.4	10.1	23.4	36.9	50.2	3.4	17.0	3 51 36.77	0.03					
	18	β Corvi	3.8	17.5	31.1	44.8	58.3	11.6	25.2	12 26 44.61	— 0 0.29	. .	.06	12 26 21.26	9.71	
	19	12 Can. Ven.	25.3	41.8	58.1	14.1	30.2	46.1	2.7	12 49 14.04	+ 0 0.15	. .	.05	12 48 51.14	8.97	
	20	Polaris, S. P.	43.0	..	32.0	21.0	15.0	15.0	..	13 2 49.20	+ 1 18.58	. .	.05	13 3 44.73	76.50	
	21	α Virginis	52.9	5.8	18.9	31.5	44.2	56.6	9.4	13 17 31.33	— 0 0.22	. .	.05	13 17 8.06	9.74	
	22	η Bootis	7.0	20.2	33.7	46.9	0.0	13.1	26.4	13 47 46.76	— 0 0.04	. .	.04	13 47 23.68	8.83	
	†23	Polaris	55.5	0.0	59.0	53.0	42.5	31.0	32.5	1 3 47.64	+ 0 17.30	. .	22.54	1 3 42.37	. .	A.
21	24	Sun, 1st L.	40.8	54.3	7.8	21.1	34.2	47.5	0.9	3 51 20.94	— 0 0.03	. .	.46	3 52 6.09	. .	
	25	Sun, 2d L.	56.1	9.5	23.0	36.2	49.7	3.0	16.1	3 53 36.23	.03					
	26	β Corvi	3.0	16.8	30.4	44.1	57.4	11.0	24.6	12 26 43.90	.29	. .	.33	12 26 21.28	9.71	
	27	γ Virginis	39.0	51.6	4.2	16.9	29.0	41.6	54.1	12 34 16.63	0.16	. .	.33	12 33 54.14	9.63	
	†28	Polaris, S. P.	42.5	42.5	31.5	23.0	15.0	13.5	17.0	13 4 26.43	17.86	. .	.32	13 3 46.25	76.19	
	29	α Virginis	52.1	5.2	18.0	30.8	43.2	55.9	8.9	13 17 30.59	0.22	. .	.32	13 17 8.05	9.74	
	30	η Bootis	5.9	19.3	33.1	46.1	59.2	12.3	25.7	13 47 45.94	0.04	. .	.31	13 47 23.59	8.84	
22	31	Polaris, S. P.	..	..	..	..	..	14.0	..	13 20 14.00	16 6.33	. .	19.90	13 3 47.77	75.16	K.
	32	α Bootis	20.7	34.1	47.5	0.9	14.1	27.3	40.7	14 9 0.76	0.03	. .	.81	14 8 40.92	8.30	
	33	Dec. +20° 50′	..	..	..	..	..	12.3	25.9	14 10 19.10	33.45	. .	.81	14 9 25.84	7.85	
	34	α² Libræ	5.9	19.4	32.3	45.4	58.2	11.0	24.2	14 42 45.20	0.25	. .	.76	14 42 25.19	+ 9.94	
	35	β Ursæ Minoris	..	58.7	..	..	..	..	56.8	14 51 57.75	22.37	. .	.74	14 51 15.64	— 4.31	
	36	β Libræ	28.9	41.3	54.3	7.1	19.8	32.0	44.8	15 9 6.89	0.21	. .	.71	15 8 46.97	+ 9.68	
	37	α Cor. Bor.	..	..	..	32.9	46.8	0.8	14.9	15 28 53.85	— 0 21.09	. .	.68	15 28 13.08	7.39	
	38	α Serpentis	26.1	38.8	51.7	4.3	16.8	29.1	..	15 36 57.80	+ 0 6.18	. .	.67	15 36 44.31	8.82	
	†39	Polaris	..	57.0	54.0	47.5	37.0	28.0	31.0	1 7 42.42	— 3 40.97	. .	18.38	1 3 43.07	74.78	A.
23	40	Sun, 1st L.	38.5	51.9	5.5	18.9	52.1	45.4	58.9	3 59 18.74	0.03	. .	17.88	4 0 8.54	. .	
	41	Sun, 2d L.	53.8	7.3	21.0	34.3	47.8	1.0	14.8	4 1 34.14	— 0 0.03					
24	42	α Persei	39.6	59.2	18.2	37.8	56.8	15.4	34.9	3 13 37.43	+ 0 0.31	. .	15.41	3 13 22.33	16.04	
25	43	Sun, 1st L.	40.2	53.8	7.3	20.9	34.0	47.5	0.9	4 7 20.66	— 0 0.14	. .	16.51	4 8 11.87	. .	
	44	Sun, 2d L.	56.0	9.5	23.1	36.4	50.0	3.0	16.7	4 9 36.39	— 0 0.14					
	45	α Aurigæ	42.5	0.7	18.7	36.8	54.8	12.4	30.5	5 5 36.63	+ 0 0.08	. .	.55	5 5 20.16	16.88	
	46	β Corvi	57.5	11.2	25.0	38.5	52.0	5.3	19.0	12 26 38.36	— 0 0.35	. .	.86	12 26 21.15	9.75	
	47	γ Virginis	33.4	46.1	58.8	11.4	23.9	36.0	48.6	12 34 11.17	0.25	. .	.87	12 33 54.05	9.67	
	48	Polaris, S. P.	31.0	35.5	24.5	10.5	7.5	4.0	11.5	13 4 17.79	15.25	. .	.89	13 3 45.65	72.89	
	49	α Virginis	46.8	59.9	12.4	25.1	38.0	50.6	3.2	13 17 25.14	0.29	. .	.90	13 17 7.95	9.75	
	50	η Bootis	0.9	14.2	27.7	41.0	54.1	7.1	20.8	13 47 40.83	— 0 0.15	. .	.92	13 47 23.76	8.85	
	51	α Lyræ	14.7	31.1	47.2	3.2	19.1	35.0	51.4	18 32 3.10	+ 0 0.01	. .	17.12	18 31 45.99	5.43	
	†52	α Arietis	..	..	..	..	..	16.1	29.7	1 59 22.90	— 0 33.99	. .	— 17.79	1 58 31.12	+ 12.48	K.

14, 15, 52. —0*s*.36 applied to correction for clock error.
28. Polaris very steady, and observations excellent.
23, 39. +0*s*.36 applied to correction for clock error.

DATE.		VALUE OF			CLOCK.	H. Rate.
		m.	*n.*	*c.*	At 11*h*.	0*s*.
		s.	s.	s.	s.	
May	18	—0.280	+0.344	+0.120	*f* 23.21	*g* .002
"	19	.280	.344	.120	22.90	.002
"	20	.280	.344	.120	23.07	*l* .010
"	21	.280	.344	.120	22.36	.015
"	22	.280	.344	.120	20.10	.098
"	23	.280	.344	.120	17.13	.106
"	24	.280	.344	.120	14.55	.111
"	25	—0.280	+0.344	+0.120	16.80	*g* .042

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
May 26	1	Sun, 1st L.	..	57.7	11.2	24.8	37.8	51.5	4.9	4 11 31.32	— 0 6.89	. .	— 17.67	4 12 14.67	. .	K.
	2	Sun, 2d L.	59.8	13.4	27.0	40.6	54.1	7.0	20.7	4 13 40.37	0.12					
	3	α Arietis	..	..	..	50.0	3.3	16.9	30.6	1 59 10.20	20.48	. .	18.28	1 58 31.44	+ 12.46	
27	4	Polaris, S. P.	..	38.0	32.0	20.0	12.0	13.0	17.0	13 8 22.00	4 9.55	. .	20.42	13 3 52.03	71.42	
	5	α Virginis	50.3	3.4	16.2	28.9	41.6	54.1	6.9	13 17 28.77	0 0.29	. .	.43	13 17 8.05	9.76	
	6	η Ursæ Majoris	..	11.8	31.4	50.8	10.2	29.5	48.9	13 42 0.43	9.65	. .	.45	13 41 30.33	7.20	
	7	η Bootis	4.3	17.8	31.2	44.7	57.7	10.7	24.1	13 47 44.36	0.15	. .	.46	13 47 23.75	8.86	
	8	α Bootis	21.5	34.9	48.3	1.8	15.0	28.0	41.6	14 9 1.59	.14	. .	.47	14 8 40.98	8.32	
	9	ε Bootis	56.1	10.7	24.8	39.0	53.0	7.0	21.2	14 38 38.83	0.09	. .	.50	14 38 18.24	7.83	
	10	α² Libræ	..	..	33.2	46.2	59.0	12.0	25.0	14 42 59.08	— 0 13.33	. .	.50	14 42 25.25	+ 9.93	
	11	β Ursæ Minoris	11.4	59.9	48.3	36.0	23.3	10.3	58.5	14 51 35.39	+ 0 1.16	. .	.51	14 51 16.04	— 4.16	
	12	δ Ophiuchi	2.9	15.8	28.2	40.9	53.3	5.2	18.3	16 6 40.66	— 0 0.27	. .	.58	16 6 19.81	+ 9.35	
	13	α Scorpii	41.0	55.2	..	..	..	..	..	16 19 48.10	+ 0 34.54	. .	.59	16 20 2.05	10.90	
	14	α Herculis	22.3	35.5	48.6	1.6	14.3	27.1	40.2	17 8 1.37	— 0 0.18	. .	.63	17 7 40.56	7.99	
	15	β Draconis	19.5	39.4	0.0	20.7	40.9	1.2	22.1	17 27 20.54	+ 0 0.18	. .	.65	17 27 0.07	2.57	
	16	β Aquilæ	..	..	..	8.3	21.0	..	46.3	19 48 25.20	— 0 17.03	. .	.78	19 47 47.39	9.16	
June 2	17	η Bootis	11.8	25.3	38.6	52.0	5.0	18.1	31.5	13 47 51.76	0.15	. .	28.00	13 47 23.61	8.90	A
	18	ϑ Centauri	33.9	39.6	54.9	10.3	25.9	41.0	56.5	13 58 10.30	.41	. .	.01	13 57 41.88	10.37	
	19	α Bootis	28.9	42.4	55.7	9.0	22.3	35.2	48.9	14 9 8.91	— 0 0.14	. .	.01	14 8 40.76	8.35	
	20	γ Bootis	34.3	51.1	7.2	23.3	39.1	55.2	11.2	14 26 23.06	+ 0 0.01	. .	.03	14 25 55.04	7.20	
	21	ε Bootis	3.9	18.0	32.2	46.3	0.5	14.7	28.8	14 38 46.34	— 0 0.09	. .	.04	14 38 18.21	7.85	
	22	α² Libræ	14.5	27.8	41.0	54.0	6.9	19.3	32.4	14 42 53.70	.31	. .	.04	14 42 25.35	9.93	
	23	β Libræ	36.9	50.0	2.8	15.2	27.9	40.1	53.0	15 9 15.13	.29	. .	.07	15 8 46.77	9.64	
	24	α Cor. Bor.	51.6	12.5	27.0	41.2	55.0	8.9	23.0	15 28 40.89	.09	. .	.09	15 28 12.71	7.37	
	25	α Serpentis	34.4	47.1	0.0	12.5	25.0	37.4	50.0	15 37 12.34	.21	. .	.09	15 36 44.04	8.77	
	26	β¹ Scorpii	21.5	34.9	48.2	1.5	14.5	27.9	41.5	15 57 1.43	.34	. .	.11	15 56 32.98	10.32	
	27	δ Ophiuchi	10.5	23.4	35.9	48.4	0.9	13.1	25.9	16 6 48.30	.26	. .	.12	16 6 19.92	9.31	
	28	β Herculis	26.7	40.4	53.6	7.2	20.6	33.9	47.6	16 24 7.14	— 0 0.13	. .	.14	16 23 38.87	7.39	
	†29	α Persei	53.8	13.1	32.7	51.7	11.0	29.8	49.3	3 13 51.63	+ 0 0.13	. .	29.08	3 13 22.68	15.86	K
	†30	Mercury, 2d L.	50.7	4.1	17.4	30.6	43.6	56.3	10.0	3 30 30.39	— 0 0.16	— 00.20	.10	3 30 1.13	. .	
3	31	Sun, 1st L.	..	..	..	..	27.7	41.0	54.7	4 42 41.13	27.15	. .	30.63	4 43 51.69	. .	
	32	Sun, 2d L.	49.7	3.6	17.5	31.2	44.4	57.6	11.6	4 46 30.80	0.13					
	33	Moon, 2d L.	11.4	24.4	37.3	50.0	2.7	15.3	28.5	12 5 49.94	0.27	— 62.57	31.03	12 4 16.07	. .	
	34	η Virginis	..	..	..	35.0	47.6	0.0	12.7	12 12 53.83	19.04	. .	.04	12 12 3.75	9.97	
	35	γ Virginis	47.4	0.1	12.7	25.0	37.6	49.8	2.7	12 34 25.04	— 0 0.25	. .	.06	12 33 53.73	9.74	
	36	12 Can. Ven.	33.1	49.7	5.9	22.0	38.0	54.0	10.2	12 49 21.84	+ 0 0.01	. .	.07	12 48 50.78	9.17	
	37	Polaris, S. P.	57.0	..	47.0	37.5	..	..	..	13 0 47.17	+ 3 37.65	. .	.08	13 3 53.74	66.81	
	38	α Bootis	..	..	59.8	12.0	..	38.3	52.0	14 9 25.53	— 0 13.50	. .	.14	14 8 40.89	8.35	
	39	ε Bootis	6.9	21.2	35.5	49.6	3.7	17.5	31.9	14 38 49.47	0.09	. .	.17	14 38 18.21	7.86	
	40	α² Libræ	..	..	..	..	..	22.7	35.7	14 43 29.20	— 0 32.72	. .	.17	14 42 25.31	9.93	
	41	β Libræ	39.9	52.9	5.7	18.4	30.7	43.5	..	15 9 11.85	+ 0 6.05	. .	.20	15 8 46.70	9.64	
	42	α Cor. Bor.	1.7	16.0	30.2	44.3	58.1	12.0	26.4	15 28 44.10	— 0 0.09	. .	.22	15 28 12.79	7.37	
	43	α Serpentis	37.7	50.3	3.0	15.7	28.1	40.7	53.3	15 37 15.56	.21	. .	.22	15 36 44.13	8.77	
	44	β¹ Scorpii	24.3	37.9	51.2	4.6	17.8	30.8	44.1	15 57 4.39	.34	. .	.24	15 56 32.81	10.31	
	45	δ Ophiuchi	13.3	26.4	39.0	51.7	4.0	16.3	29.0	16 6 51.39	— 0 0.26	. .	.25	16 6 19.88	9.30	
5	46	Sun, 1st L.	49.8	3.7	17.4	30.9	44.5	57.9	..	4 52 24.03	+ 0 6.66	. .	34.93	4 53 4.23	. .	
	47	Sun, 2d L.	..	20.8	34.3	47.8	1.3	14.8	28.5	4 54 54.58	— 0 6.94					
	†48	Mercury	45.8	59.2	12.5	25.9	39.1	52.4	5.6	3 52 25.79	0.15	. .	.71	3 51 50.93	. .	
	†49	α Tauri	2.0	15.2	28.4	41.4	54.2	7.2	20.5	4 27 41.27	.16	. .	.71	4 27 6.40	12.85	
6	50	Sun, 1st L.	58.0	11.9	25.4	39.0	52.8	6.0	19.5	5 56 38.94	.12	. .	35.08	4 57 12.41	. .	
	51	Sun, 2d L.	15.2	29.2	42.9	56.4	9.9	23.4	37.0	5 58 56.29	— 0 0.12					
	52	α Aurigæ	1.2	19.5	37.4	55.3	13.2	31.0	49.1	5 5 55.24	+ 0 0.09	. .	— 35.08	5 5 20.25	+ 16.76	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 12h.	H. Rate. 0s.
	s.	s.	s.	s.	
May 26	—0.366	+0.272	+1.120	f 17.99	g .028
" 27	.366	.292	.120	20.36	.054
June 2	.366	.272	.120	27.90	.054
" 3	.366	.272	.120	31.03	.054
" 5	.366	.272	.120	34.97	.006
" 6	—0.366	+0.272	+0.120	35.12	g .006

29, 30. —0s.36 applied to correction for clock.
48, 49. +0s.36 applied to correction for clock.
48. Observed the centre of Mercury.
The clock was several times adjusted between May 22 and June 6: hence the apparent irregularity of its error and rate.

ATE 846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
e 6	1	Polaris, S. P. . . .	7.0	4.5	53.0	42.0	33.0	34.5	37.5	13 3 47.36	— 0 15.20	. .	+ 25.16	13 3 57.32	+ 64.34	A.
	2	α Virginis	4.8	17.8	30.8	43.2	56.0	8.5	21.3	13 16 43.20	— 0 0.29	. .	.16	13 17 8.07	9.82	
	3	η Ursæ Majoris . . .	6.1	25.8	45.6	5.1	24.2	43.9	3.1	13 41 4.83	+ 0 0.14	. .	.16	13 41 30.13	7.37	
	4	η Bootis	18.6	32.1	45.3	58.8	12.0	24.9	38.1	13 46 58.54	— 0 0.15	. .	.16	13 47 23.55	8.93	
	5	κ Virginis	41.4	54.0	7.0	19.5	32.2	44.4	57.5	14 4 19.43	.29	. .	.15	14 4 44.29	9.76	
	6	α Bootis	35.5	49.1	2.6	15.9	29.0	42.4	55.7	14 8 15.74	— 0 0.14	. .	.15	14 8 40.75	8.37	
	7	γ Bootis	41.5	57.6	13.7	29.9	46.0	2.0	18.2	14 25 29.84	+ 0 0.01	. .	.15	14 25 55.00	+ 7.24	
	8	Moon, 1st L. . . .	23.5	37.3	..	..	17.3	30.5	44.0	14 41 6.52	— 0 2.92	+ 67.85	.15	14 42 36.60	. .	
	9	β Ursæ Minoris . . .	25.0	14.2	2.0	50.3	37.4	24.6	12.9	14 50 49.49	+ 0 1.09	. .	.15	14 51 15.73	— 3.76	
	10	β Libræ	43.9	56.5	9.6	22.2	34.8	47.2	0.2	15 8 22.06	— 0 0.29	. .	.14	15 8 46.91	+ 9.67	
	11	α Cor. Bor.	5.2	19.7	33.9	47.9	2.0	15.9	30.0	15 27 47.80	.09	. .	.14	15 28 12.85	7.37	
	12	α Serpentis	41.7	54.1	7.0	19.4	32.0	44.1	57.1	15 36 19.06	— 0 0.21	. .	.14	15 36 43.99	+ 8.76	
	13	ζ Ursæ Minoris . . .	12.0	15.0	16.9	18.2	19.0	19.7	22.2	15 49 17.57	+ 0 1.53	. .	.14	16 49 44.24	— 12.77	
8	14	Sun, 1st L. . . .	..	..	..	54.9	8.5	21.8	35.5	5 4 15.17	— 0 20.55	. .	23.65	5 5 26.86	. .	K.
	15	Sun, 2d L. . . .	30.8	44.9	58.3	..	25.6	39.1	52.7	5 6 11.90	0.10					
15	16	Sun, 2d L. . . .	32.4	46.3	0.1	13.9	27.3	40.9	54.8	5 35 13.67	0.12	— 68.86	22.88	5 34 27.57	. .	
	17	α² Geminorum . . .	39.3	54.3	9.2	23.9	38.6	53.4	8.3	7 24 23.86	0.06	. .	.88	7 24 46.68	+ 14.45	
	18	12 Can. Ven.	..	..	11.8	28.0	48.7	59.8	16.3	12 48 43.92	15.95	. .	.90	12 48 50.87	9.36	
	19	Polaris, S. P. . . .	13.0	..	5.0	..	47.0	..	46.0	13 3 57.75	14.92	. .	.90	13 4 5.73	57.44	
	20	α Virginis	..	..	..	..	..	..	23.5	13 17 23.50	38.45	. .	.90	13 17 7.95	9.90	
	21	ε Bootis	..	..	..	..	9.7	23.7	37.5	14 38 23.56	28.24	. .	.90	14 38 18.22	7.93	
	22	α² Libræ	23.4	36.7	49.8	2.9	16.3	28.1	41.4	14 42 2.66	0.32	. .	.90	14 42 25.24	9.96	
	23	β Libræ	..	58.8	11.6	24.3	36.7	49.3	2.2	15 8 30.48	6.50	. .	.91	15 8 46.89	9.65	
	24	α Cor. Bor.	..	..	..	..	..	17.9	32.0	15 28 24.95	35.23	. .	.91	15 28 12.63	7.40	
	25	α Serpentis	..	..	..	..	..	..	59.2	15 36 59.25	38.02	. .	.91	15 36 44.14	8.75	
	26	β¹ Scorpii	..	..	..	..	23.5	36.9	50.3	15 56 36.90	26.83	. .	.91	15 56 32.98	10.26	
	27	δ Ophiuchi	..	..	..	57.3	9.8	22.3	34.3	16 6 15.92	19.06	. .	.91	16 6 19.77	9.25	
	28	α Scorpii	57.6	11.8	26.0	39.9	53.9	7.3	21.7	16 19 39.74	0.37	. .	.92	16 20 2.29	10.74	
16	†29	Polaris, S. P. . . .	14.0	14.0	4.5	52.5	45.5	42.5	44.5	13 3 56.79	15.20	. .	23.36	13 4 4.95	56.66	A.
	30	α Virginis	6.5	19.3	32.2	45.0	57.6	10.0	23.1	13 16 44.81	0.29	. .	.36	13 17 7.88	9.91	
	31	m Virginis	33.8	46.5	59.2	12.0	24.5	37.0	49.8	13 33 11.83	.28	. .	.35	13 33 34.90	9.81	
	32	Virginis, (4608) . .	31.3	44.7	57.9	11.0	23.9	36.9	50.2	13 41 10.84	.33	. .	.35	13 41 33.86	10.01	
	33	η Bootis	20.5	33.8	47.0	0.4	13.4	26.7	40.0	13 47 0.26	.15	. .	.35	13 47 23.46	9.01	
	34	α Bootis	37.7	51.0	4.5	17.8	30.9	44.3	57.5	14 8 17.67	.14	. .	.34	14 8 40.87	8.45	
	35	δ Ophiuchi	19.1	32.0	44.6	57.3	9.6	22.0	34.5	16 5 57.01	.26	. .	.30	16 6 20.05	9.25	
	36	α Scorpii	58.0	11.5	25.4	39.6	53.3	7.2	21.2	16 19 39.46	.37	. .	.29	16 20 2.38	10.74	
	37	β Herculis	35.5	49.0	2.3	16.0	29.4	42.7	56.5	16 23 15.91	— 0 0.13	. .	.29	16 23 39.07	7.34	
	38	η Herculis	28.2	44.5	0.9	17.0	33.0	49.0	5.1	16 37 16.81	+ 0 0.01	. .	.28	16 37 40.10	5.36	
	39	η Ophiuchi	34.8	47.9	1.0	13.9	26.9	39.4	52.6	17 1 13.79	— 0 0.32	. .	.28	17 1 36.75	10.08	
	†40	α Herculis	38.5	51.5	4.9	17.6	30.9	..	..	17 7 4.68	+ 0 12.84	. .	.27	17 7 40.79	7.80	
	†41	ξ Draconis	22.7	46.0	9.0	32.2	55.0	17.6	..	17 50 20.42	+ 0 11.72	. .	.26	17 50 55.40	1.01	
17	42	Sun, 1st L. . . .	..	47.8	1.5	15.5	..	42.4	56.2	5 41 20.68	— 0 5.60	. .	22.55	5 42 46.47	. .	K.
	43	Sun, 2d L. . . .	51.8	5.7	19.4	33.0	46.3	0.2	13.8	5 43 32.88	— 0 0.12					
	44	12 Can. Ven.	39.6	56.1	12.1	28.4	44.5	0.3	16.4	12 48 28.20	+ 0 0.01	. .	.45	12 48 50.66	9.39	
	45	Polaris, S. P. . . .	14.0	..	5.5	55.0	49.0	45.0	48.0	13 6 36.09	— 2 52.42	. .	.45	13 4 6.12	55.84	
	46	α Virginis	7.4	20.3	32.8	45.6	58.5	10.9	23.9	13 16 45.63	0.29	. .	.45	13 17 7.79	9.92	
	47	ε Bootis	13.3	27.6	41.8	56.0	10.0	24.1	38.3	14 37 55.87	0.09	. .	.43	14 38 18.21	7.94	
	48	α² Libræ	..	..	..	..	16.1	29.0	42.2	14 42 29.10	26.24	. .	.43	14 42 25.29	+ 9.97	
	49	β Ursæ Minoris . . .	..	16.3	4.3	52.3	39.3	26.2	14.9	14 51 15.55	22.85	. .	.43	14 51 15.13	— 3.19	
	50	β Libræ	46.7	59.4	12.2	24.8	37.4	49.7	2.7	15 8 24.70	— 0 0.29	. .	.42	15 8 46.83	+ 9.65	
	51	α Lyræ	35.9	52.0	8.2	24.6	..	..	..	18 31 0.17	+ 0 24.00	. .	.38	18 31 46.55	5.30	
18	52	Polaris, S. P. . . .	17.0	16.0	5.0	55.5	47.2	44.0	47.0	13 3 58.71	— 0 17.20	. .	+ 22.50	13 4 4.01	+ 54.97	A.

29. Polaris steady, and observations excellent.
40. Cloudy at wires F. and G.
41. Cloudy at wire G.

DATE.	VALUE OF m.	n.	c.	CLOCK. At 12h.	H. Rate. 0s.
	s.	s.	s.	s.	
June 6	—0.366	+0.272	+0.120	f 25.17	g .009
" 8	.366	.272	.120	23.59	.009
" 15	.366	.272	.120	22.90	l .003
" 16	.366	.272	.120	23.39	g .022
" 17	.366	.272	.120	22.46	.013
" 18	—0.366	+0.272	+0.120	22.51	g .013

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
June 18	1	α Virginis	7.3	20.2	23.0	45.8	58.5	10.9	23.9	13 16 45.66	— 0 0.29	. .	+ 22.50	13 17 7.87	+ 9.92	A
	2	η Ursæ Majoris	8.2	28.1	47.9	7.5	26.9	46.2	5.9	13 41 7.24	+ 0 0.14	. .	.49	13 41 29.87	7.60	
	3	η Bootis	21.1	34.2	48.0	1.4	14.4	27.3	40.8	13 47 1.03	— 0 0.15	. .	.49	13 47 23.37	9.03	
	4	α Draconis	22.6	52.7	22.2	52.1	22.2	51.2	21.1	13 59 52.01	+ 0 0.50	. .	.49	14 0 15.00	4.68	
	5	κ Virginis	43.7	56.8	9.2	22.0	34.9	47.1	0.0	14 4 21.96	— 0 0.29	. .	.49	14 4 44.16	9.83	
	6	α Bootis	38.2	51.6	5.3	18.2	31.8	45.0	58.3	14 8 18.34	— 0 0.14	. .	.49	14 8 40.69	8.46	
	7	γ Bootis	43.9	0.2	16.5	32.6	48.4	4.3	20.7	14 25 32.37	+ 0 0.01	. .	.48	14 25 54.86	7.28	
	8	ε Bootis	13.2	27.5	41.9	56.0	10.0	24.0	38.2	14 37 55.83	— 0 0.09	. .	.48	14 38 18.22	7.96	
	9	α^2 Libræ	24.0	37.1	50.2	3.1	16.0	29.0	42.1	14 42 3.07	.32	. .	.48	14 42 25.23	9.97	
	10	ξ^2 Libræ	27.8	40.8	53.5	6.2	19.0	31.5	44.2	14 48 6.14	.29	. .	.48	14 48 28.33	9.79	
	11	Libræ, (4950)	4.0	17.8	31.6	45.8	59.2	12.9	26.8	14 54 45.44	0.36	. .	.48	14 55 7.56	10.45	
	†12	α Persei	3.2	..	41.9	1.3	20.3	39.4	58.9	3 13 17.50	16.27	. .	21.96	3 13 23.19	15.38	K
19	13	Sun, 1st L.	..	..	21.9	35.6	48.9	2.3	16.6	5 49 49.06	13.79	. .	.92	5 51 5.89	. .	
	14	Sun, 2d L.	11.5	25.4	39.3	53.0	6.5	20.0	33.9	5 51 52.80	0.12					
20	15	Sun, 1st L.	3.8	17.8	31.5	45.1	58.9	12.3	26.2	5 53 45.09	.12	. .	.61	5 55 15.72	. .	
	16	Sun, 2d L.	22.1	36.1	49.8	3.4	17.2	30.6	44.4	5 56 3.37	.12					
22	17	α Serpentis	46.9	59.8	12.6	25.3	37.6	50.0	2.7	15 36 24.99	.28	. .	19.39	15 36 44.10	+ 8.77	
	18	ζ Ursæ Minoris	..	19.0	20.3	22.0	23.5	24.5	26.9	15 49 52.70	28.95	. .	.38	15 49 43.13	— 11.92	
	19	β^1 Scorpii	..	..	..	..	27.4	40.6	54.0	15 56 40.66	26.95	. .	.38	15 56 33.09	+ 10.25	
	20	δ Ophiuchi	23.2	35.6	48.8	1.1	13.6	26.0	38.8	16 6 1.01	.24	. .	.38	16 6 20.05	9.23	
	21	α Scorpii	1.0	15.8	29.8	43.5	57.4	11.3	25.1	16 19 43.41	.50	. .	.38	16 20 2.49	10.72	
	22	γ Draconis	..	..	..	..	..	25.3	45.7	17 53 35.50	— 0 49.94	. .	.36	17 53 4.92	2.48	
	23	μ^1 Sagittarii	37.8	51.4	5.0	18.3	31.5	..	58.4	18 4 13.73	+ 0 3.82	. .	.35	18 4 36.90	10.49	
	24	α Lyræ	39.0	55.1	11.6	27.3	43.2	59.3	15.3	18 31 27.26	+ 0 0.01	. .	.35	18 31 46.62	4.98	
	25	ζ Aquilæ	..	..	..	..	16.8	29.7	42.6	18 58 29.70	— 0 25.96	. .	.34	18 58 23.08	7.77	
	26	η Lyræ	26.4	42.7	58.9	15.0	41.1	47.0	3.2	19 8 14.90	+ 0 0.01	. .	.34	19 8 34.25	4.99	
	27	Aquilæ, (6615)	33.8	46.8	59.7	12.4	25.3	37.4	50.7	19 12 12.30	— 0 0.27	. .	.34	19 12 31.37	7.85	
	28	δ Aquilæ	50.4	3.0	15.9	28.5	40.8	53.0	5.7	19 17 28.19	.31	. .	.34	19 17 47.22	8.78	
	29	α Vulpeculæ	20.2	34.4	48.3	1.9	15.4	29.2	43.0	19 22 1.77	.15	. .	.34	19 22 20.96	6.81	
23	30	Sun, 1st L.	34.5	48.8	2.3	16.0	29.6	43.1	56.6	6 6 15.84	.16	. .	.56	6 7 44.22	. .	A
	31	Sun, 2d L.	52.5	6.5	20.2	33.9	47.4	1.2	15.0	6 8 33.81	.16					
24	32	α Tauri	8.4	21.5	34.6	47.4	0.4	13.3	26.4	4 26 47.44	.21	. .	.25	4 27 6.48	12.63	
	33	γ Aquilæ	2.3	15.2	28.0	40.8	53.3	5.8	18.8	19 38 40.60	.26	. .	.06	19 38 59.40	8.17	
	34	α Aquilæ	22.5	35.2	48.0	0.7	13.2	25.6	38.5	19 43 0.53	.27	. .	.06	19 43 19.32	8.43	
	35	β Aquilæ	51.4	4.2	16.6	29.5	41.8	54.5	7.0	19 47 29.29	.29	. .	.06	19 47 48.06	8.53	
25	36	Sun, 1st L.	55.1	9.0	22.5	36.5	49.9	3.7	17.5	6 14 36.31	.16	. .	18.56	6 16 3.54	. .	K
	37	Sun, 2d L.	12.7	26.7	40.3	54.2	7.7	21.2	35.0	6 16 53.97	.16					
July 1	38	Moon, 1st L.	3.0	16.2	29.3	42.2	54.8	7.6	20.6	12 33 41.96	— 0 0.36	+ 62.67	17.63	12 35 1.90	. .	
	39	Polaris, S. P.	34.5	34.0	23.5	13.5	6.0	4.5	..	13 0 19.33	+ 3 46.74	. .	.63	13 4 16.06	44.25	
	40	α Virginis	12.2	25.0	37.8	50.5	3.3	15.8	28.7	13 16 50.47	— 0 0.29	. .	.63	13 17 7.71	10.03	
	41	α Cor. Bor.	..	27.0	41.2	55.2	9.1	23.0	37.6	15 28 2.18	7.18	. .	.61	15 28 12.61	7.50	
	42	α Serpentis	48.7	1.6	14.2	26.9	39.4	52.0	4.7	15 36 26.79	— 0 0.28	. .	.61	15 36 44.12	+ 8.81	
	43	ζ Ursæ Minoris	17.8	20.4	22.1	24.0	24.8	..	..	15 48 21.82	+ 1 2.38	. .	.61	15 49 42.81	— 11.28	
	44	β^1 Scorpii	35.9	49.3	2.8	16.0	29.2	42.5	55.6	15 56 15.90	— 0 0.46	. .	.61	15 56 33.05	+ 10.27	
	45	δ Ophiuchi	24.9	37.8	50.4	2.8	15.4	27.7	40.2	16 6 2.74	.34	. .	.61	16 6 20.01	9.25	
5	46	Venus, 2d L.	10.7	24.0	37.3	50.7	3.9	17.0	30.4	4 12 50.57	.36	— 00.51	16.16	4 13 5.86	. .	A
	47	α Aurigæ	10.8	29.0	47.1	5.0	23.0	40.6	58.9	5 5 4.91	.16	. .	.14	5 5 20.89	16.15	
6	48	Sun, 1st L.	28.5	42.1	56.0	9.5	23.0	36.6	50.1	7 0 9.40	.34	. .	15.80	7 1 33.43	. .	
	49	Sun, 2d L.	45.8	59.5	13.1	26.5	40.2	53.5	7.2	7 2 26.54	.34					
	50	α Scorpii	5.1	19.3	33.5	47.3	1.2	15.0	29.0	16 19 47.20	.61	. .	.68	16 20 2.27	10.73	
	51	η Herculis	35.8	52.1	8.4	24.6	40.7	56.6	12.9	16 37 24.44	.23	. .	.67	16 37 39.88	5.47	
	52	η Ophiuchi	42.4	55.7	8.5	21.8	34.4	47.4	0.3	17 1 21.50	— 0 0.55	. .	+ 15.67	17 1 36.62	+ 10.01	

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 12h.	0s.
	s.	s.	s.	s.	
June 18	—0.366	+0.272	+0.120	s 22.53	g .013
" 19	.366	.272	.120	21.86	.013
" 20	.366	.272	.120	21.55	.013
" 22	.447	.372	.120	19.45	.013
" 23	.447	.372	.120	19.50	.013
" 24	.447	.372	.120	19.17	.013
" 25	.447	.372	.120	18.50	.013
July 1	.447	.372	.120	17.64	.007
" 5	.463	.300	.000	16.01	.021
" 6	—0.463	+0.300	0.000	s 15.75	g .013

12. —0s.36 applied to correction for clock error.

	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	S.	S.	H. M. S.	S.	
6	1	α Herculis	46.4	59.5	12.5	25.4	38.3	51.0	4.1	17 7 25.31	— 0 0.39	. .	+ 15.67	17 7 40.59	+ 7.76	A.
	2	Moon, 1st L. . . .	36.6	50.7	4.3	18.1	31.8	45.2	58.9	17 13 17.94	.57	+ 72.11	.67	17 14 45.15	. .	
	3	α Ophiuchi	56.4	9.4	22.4	35.2	47.9	0.6	13.5	17 27 35.06	.40	. .	.66	17 27 50.32	7.85	
	4	Ophiuchi, (5987) . .	20.6	34.1	47.8	1.3	14.5	28.0	41.3	17 34 1.09	.58	. .	.66	17 34 16.17	10.40	
7	5	Sun, 1st L. . . .	36.4	50.1	3.8	17.4	30.8	44.3	58.0	7 4 17.26	.34	. .	14.81	7 5 40.10	. .	K.
	6	Sun, 2d L.	53.1	7.0	20.6	34.2	47.6	1.1	14.5	7 6 34.01	— 0 0.34					
	7	12 Can. Ven.	47.3	3.7	20.0	..	..	..	..	12 48 3.66	+ 0 32.07	. .	.64	12 48 50.37	9.73	
	8	Polaris, S. P. . . .	37.5	..	26.5	15.0	9.5	6.5	11.0	13 6 57.66	— 2 49.12	. .	.63	13 4 23.17	38.80	
	9	α Virginis	15.2	28.1	40.9	53.6	6.4	18.8	31.5	13 16 53.50	0 0.52	. .	.62	13 17 7.60	10.11	
	10	α Serpentis	..	..	..	30.0	42.7	55.2	7.8	15 36 48.93	— 0 19.35	. .	.55	15 36 44.13	+ 8.84	
	11	ζ Ursæ Minoris . . .	21.0	24.0	25.5	27.4	28.0	29.0	32.1	15 49 26.83	+ 0 0.91	. .	.55	15 49 42.29	— 10.79	
	12	β¹ Scorpii	39.0	52.4	6.1	19.3	32.2	45.6	58.8	15 56 19.06	— 0 0.57	. .	.54	15 56. 33.03	+ 10.29	
	13	ε Ursæ Minoris . . .	..	37.2	11.4	45.0	17.5	50.0	24.5	17 2 30.93	45.05	. .	.51	17 2 0.39	— 29.26	
	14	ξ Ophiuchi	56.5	10.0	23.6	36.9	50.0	3.3	16.8	17 11 36.73	0.58	. .	.50	17 11 50.65	+ 10.44	
	15	α Ophiuchi	57.7	10.8	23.7	36.6	49.0	2.0	14.9	17 27 36.39	.39	. .	.49	17 27 50.49	7.85	
	16	Ophiuchi, (5987) . .	21.3	35.2	49.0	2.7	16.1	29.1	42.9	17 34 2.39	.58	. .	.49	17 34 16.30	10.40	
	17	μ¹ Sagittarii	43.0	56.4	10.1	23.5	36.5	50.1	3.6	18 4 23.31	.58	. .	.48	18 4 37.21	+ 10.35	
	18	Moon, 1st L. . . .	19.4	33.5	47.1	0.9	14.8	28.2	41.8	18 18 0.81	— 0 0.52	+ 72.80	.47	18 19 27.56	. .	
	19	δ Ursæ Minoris . . .	16.5	50.5	..	53.5	24.5	50.0	..	18 20 27.00	+ 1 29.57	. .	.47	18 22 11.04	— 86.64	
	20	α Lyræ	44.0	0.6	16.8	32.8	48.5	4.3	20.3	18 31 32.47	— 0 0.23	. .	.46	18 31 46.70	+ 4.89	
	21	λ Ursæ Minoris . . .	..	..	..	..	12.5	33.0	5.0	20 37 36.85	20 34.06	. .	.40	20 17 17.17	—252.63	
	22	α Cygni	..	..	..	0.3	18.0	35.1	53.0	20 36 26.60	0 26.59	. .	.40	20 36 14.41	+ 4.64	
	23	61¹ Cygni	1.7	17.8	33.9	49.6	5.3	21.2	37.1	21 59 49.51	0.23	. .	.39	21 0 3.67	7.13	
8	24	η Herculis	..	53.6	9.9	25.9	41.9	58.0	..	16 37 25.86	— 0 0.27	. .	.48	16 37 40.07	5.48	A.
	25	η Ophiuchi	..	57.2	0.3	..	..	49.0	..	17 1 18.83	+ 0 3.63	. .	.47	17 1 36.39	10.01	
	26	α Herculis	48.0	1.2	14.2	..	39.9	52.0	5.6	17 7 26.82	— 0 0.49	. .	.47	17 7 40.80	7.76	
	27	λ Herculis	38.0	52.0	..	..	..	47.9	1.9	17 24 19.95	.73	. .	.46	17 24 33.68	6.63	
	28	β Ophiuchi	3.8	16.4	29.0	41.6	53.9	6.5	19.2	17 35 41.49	.59	. .	.46	17 35 55.36	8.45	
	29	γ Draconis	49.7	10.4	30.8	51.0	10.0	30.0	51.1	17 52 50.63	.04	. .	.45	17 53 5.04	2.51	
	30	μ¹ Sagittarii	43.1	56.9	10.1	23.6	36.9	50.0	3.8	18 4 23.49	— 0 0.73	. .	.44	18 4 37.20	+ 10.35	
	31	δ Ursæ Minoris . . .	13.5	49.0	21.5	50.7	20.0	50.5	22.0	18 21 49.60	+ 0 6.60	. .	.44	18 22 10.64	— 86.46	
	32	β Lyræ	27.6	42.9	58.0	12.9	27.8	42.6	57.6	18 44 12.77	— 0 0.30	. .	.43	18 44 26.90	+ 5.57	
	33	ο Sagittarii	36.8	50.2	4.1	17.5	30.8	44.1	57.8	18 55 17.33	.73	. .	.43	18 55 31.03	10.39	
	34	ζ Aquilæ	30.5	43.6	56.4	9.5	22.1	34.9	48.0	18 58 9.29	.31	. .	.42	18 58 23.40	7.60	
	†35	Moon, 1st L. . . .	25.6	39.4	53.2	6.8	20.2	33.5	47.3	19 23 6.57	.70	+ 72.52	.41	19 24 32.80	. .	
	36	γ Aquilæ	7.4	20.4	33.1	46.0	58.6	11.0	23.9	19 38 45.77	.50	. .	.41	19 38 59.68	7.97	
	37	α Aquilæ	27.7	40.3	53.0	5.9	18.2	31.0	43.6	19 43 5.67	.51	. .	.41	19 43 19.57	+ 8.21	
	†38	ε Ursæ Minoris, S. P. .	..	..	..	..	22.0	..	31.5	5 4 56.75	3 5.61	. .	13.83	5 2 2.91	— 29.15	K.
9	39	Sun, 1st L. . . .	49.7	3.4	17.1	30.7	44.0	57.4	11.1	7 12 30.49	0 0.40	. .	.63	7 13 51.96	. .	
	40	Sun, 2d L.	6.1	19.8	33.7	47.0	0.6	14.1	27.5	7 14 46.97	.40					
	41	Mercury, 1st L. . .	..	..	..	..	34.8	47.9	1.4	8 38 48.05	27.03	+ 00.20	.58	8 38 34.78	. .	
	42	12 Can. Ven.	48.4	5.0	21.3	37.6	53.4	9.5	25.6	12 48 37.26	0.23	. .	.43	12 48 50.46	+ 9.76	
	43	Polaris, S. P. . . .	..	..	32.5	22.0	..	14.5	15.0	13 12 21.00	8 11.10	. .	.42	13 4 23.32	37.16	
	44	α Virginis	16.4	29.4	42.3	55.0	7.6	20.4	33.1	13 16 54.89	0 0.65	. .	.42	13 17 7.66	10.14	
	45	α Cor. Bor.	17.2	31.6	45.8	0.0	13.5	27.9	42.0	15 27 59.76	.56	. .	.34	15 28 12.74	7.59	
	46	α Serpentis	53.3	6.0	19.0	31.3	44.0	56.3	9.1	15 36 31.29	— 0 0.53	. .	.34	15 36 44.10	+ 8.86	
	47	ζ Ursæ Minoris . . .	21.6	24.3	26.3	28.0	29.2	..	..	15 48 25.88	+ 1 2.80	. .	.33	15 49 42.01	— 10.62	
	48	γ Aquilæ	8.7	21.7	34.3	47.0	59.7	12.2	25.0	19 38 46.94	— 0 0.49	. .	.20	19 38 59.65	+ 7.95	
	49	α Aquilæ	28.7	41.7	54.4	6.9	19.7	32.1	44.8	19 43 6.89	.51	. .	.20	19 43 19.58	8.20	
	50	β Aquilæ	57.8	10.6	23.0	35.8	48.1	0.2	13.3	19 47 35.54	.52	. .	.20	19 47 48.22	8.30	
	51	α² Capricorni	..	..	8.8	21.7	34.1	46.9	59.8	20 9 34.26	— 0 13.54	. .	.18	20 9 33.90	+ 9.67	
	52	λ Ursæ Minoris . . .	..	57.0	25.0	51.0	9.0	..	..	20 11 35.50	+ 5 29.64	. .	+ 13.18	20 17 18.32	—252.59	

35. The Moon about six hours after full; a cloud obscured 2d limb.
38. —0s.26 applied to correction for clock error.

DATE.		VALUE OF			CLOCK.	H. Rate.
		m.	n.	c.	At 12h.	0s.
		s.	s.	s.	s.	
July	6	—0.463	+0.300	0.000	f 15.73	g .013
"	7	.463	.300	.000	14.66	.030
"	8	.576	.428	.000	14.58	.023
"	9	—0.576	+0.428	0.000	13.46	g .034

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	S.	S.	H. M. S.	S.	
July 9	1	Moon, 2d L.	45.0	58.6	11.9	25.2	38.4	51.7	5.1	20 29 25.13	— 0 0.68	— 71.47	+ 13.17	20 28 26.15	. .	K.
	2	α Cygni	8.3	26.4	44.0	1.8	19.0	36.6	54.6	20 36 1.53	0.14	. .	.17	20 36 14.55	+ 4.60	
	3	ε Aquarii	..	..	..	11.0	23.8	36.2	49.2	20 39 20.05	19.75	. .	.17	20 39 23.48	9.47	
	4	μ Aquarii	..	..	59.0	11.7	24.3	36.8	49.6	20 44 24.28	13.35	. .	.17	20 44 24.11	9.44	
	†5	Venus, 2d L.	22.8	36.3	50.0	3.3	16.6	29.7	43.2	4 32 3.13	0.42	— 00.51	.26	4 32 15.47	. .	A.
	†6	α Aurigæ	13.3	31.8	49.9	7.9	25.9	43.2	1.4	5 5 7.63	.13	. .	.24	5 5 20.74	16.03	
	†7	β Tauri	39.1	53.4	8.0	22.1	36.2	50.3	4.6	5 16 21.96	.35	. .	.23	5 16 34.85	13.73	
10	8	Sun, 1st L.	55.6	9.4	23.2	36.5	49.8	3.4	17.0	7 16 36.41	.34	. .	12.93	7 17 57.31	. .	
	9	Sun, 2d L.	12.2	26.0	39.8	53.1	6.4	20.1	53.7	7 18 53.04	.34					
	10	Mercury	26.8	40.2	53.3	6.8	20.0	33.3	46.8	8 45 6.74	.36	. .	13.07	8 45 19.45	. .	
	11	α Cor. Bor.	16.9	31.2	45.3	59.4	13.4	27.4	41.6	15 27 59.31	.31	. .	.73	15 28 12.73	7.60	
	12	α Serpentis	53.0	5.5	18.2	30.9	43.4	55.9	8.4	15 36 30.76	.43	. .	.74	15 36 44.07	8.87	
	13	χ Lupi	17.1	32.0	47.1	2.2	17.0	31.8	46.9	15 41 2.01	— 0 0.66	. .	.75	15 41 15.10	+ 11.19	
	14	ζ Ursæ Majoris	21.8	24.0	26.2	27.8	28.9	29.7	31.3	15 49 27.10	+ 0 0.98	. .	.76	15 49 41.84	— 10.54	
	15	ε Aquarii	31.6	44.5	57.2	10.0	22.7	35.2	47.9	20 39 9.87	— 0 0.52	. .	14.24	20 39 23.59	+ 9.47	
	16	μ Aquarii	32.1	45.0	57.9	10.5	23.0	35.7	48.4	20 44 10.37	.51	. .	.24	20 44 24.09	9.43	
	17	61¹ Cygni	1.7	17.9	33.8	49.7	5.5	21.2	37.3	20 59 49.58	.23	. .	.27	21 0 3.62	7.06	
	18	β Aquarii	38.5	51.2	3.9	16.6	29.0	41.4	54.1	21 23 16.38	.43	. .	.31	21 23 30.26	9.28	
	19	Moon, 2d L.	24.1	37.2	50.3	3.2	16.4	29.4	42.6	21 31 3.31	.52	— 70.06	.32	21 30 7.05	. .	
	20	ε Pegasi	48.5	1.4	14.1	26.8	39.3	51.9	4.6	21 36 26.66	.41	. .	.33	21 36 40.58	8.50	
	21	ι Aquarii	17.5	30.4	43.3	56.4	9.2	22.1	35.0	21 57 56.27	.54	. .	.37	21 58 10.10	9.74	
	22	ϑ Aquarii	53.4	6.3	19.0	31.6	44.2	56.6	9.5	22 8 31.51	.51	. .	.38	22 8 45.38	+ 9.50	
	23	Saturn, 1st L.	4.1	17.0	29.9	42.5	55.5	7.8	20.9	22 10 42.53	.53	+ 00.61	.39	22 10 57.00	. .	
	†24	Venus, 2d L.	12.0	25.7	39.1	52.4	5.7	18.8	32.4	4 36 52.30	0 0.35	— 00.50	.65	4 37 6.10	. .	K
	†25	ε Ursæ Majoris, S. P. .	8.0	42.5	..	46.8	..	54.2	29.0	5 1 48.10	0 2.66	. .	.69	5 2 0.13	— 28.91	
	†26	β Tauri	37.9	52.3	6.8	20.9	35.0	49.1	3.5	5 16 20.81	0 0.30	. .	.72	5 16 35.23	+ 13.70	
11	27	Sun, 1st L.	58.5	12.2	25.8	39.3	52.8	6.3	19.8	7 20 39.24	.34	. .	.76	7 22 1.77	. .	
	28	Sun, 2d L.	14.7	28.3	42.3	55.7	9.0	22.3	36.0	7 22 55.47	.34					
	29	α Serpentis	..	..	..	..	41.5	54.0	6.7	15 36 54.07	— 0 25.60	. .	15.68	15 36 44.15	+ 8.88	
	30	ζ Ursæ Minoris	20.0	22.8	24.5	26.1	27.0	28.1	29.9	15 49 25.49	+ 0 0.98	. .	.70	15 49 42.17	— 10.45	
	31	β¹ Scorpii	..	..	..	18.0	31.0	44.2	57.7	15 56 37.72	— 0 20.48	. .	.71	15 56 32.95	+ 10.32	
	32	δ Ophiuchi	26.9	39.8	52.3	4.9	17.2	29.8	42.5	16 6 4.79	— 0 0.48	. .	.73	16 6 20.04	+ 9.30	
	33	δ Ursæ Minoris	..	48.5	21.9	52.5	21.0	..	..	18 20 5.97	+ 1 48.94	. .	.98	18 22 10.89	— 85.99	
	34	α Lyræ	42.5	38.9	15.2	31.0	46.9	2.9	18.9	18 31 30.90	— 0 0.22	. .	16.00	18 31 46.68	+ 4.88	
13	†35	12 Can. Ven.	40.6	57.0	13.3	29.7	45.6	1.4	17.7	12 28 29.33	— 0 0.06	. .	20.78	12 48 50.05	9.84	
	†36	Polaris, S. P.	46.5	..	34.0	24.5	18.5	14.5	..	13 2 51.60	+ 1 14.20	. .	.80	13 4 26.60	34.23	
	†37	α Virginis	..	..	34.4	47.2	59.8	12.4	25.2	13 16 59.80	— 0 13.30	. .	.83	13 17 7.33	+ 10.19	
	38	β Ursæ Minoris	..	..	..	..	..	..	15.3	14 53 15.30	— 2 22.48	. .	21.00	14 51 13.82	— 1.46	
	39	β Libræ	47.1	0.0	12.7	25.4	38.1	50.6	3.4	15 8 25.33	+ 0 0.41	. .	.02	15 8 46.76	+ 9.81	
	40	α Cor. Bor.	8.9	23.1	37.5	51.6	..	..	..	15 27 30.27	+ 0 21.48	. .	.06	15 28 12.81	7.64	
	41	α Serpentis	..	..	..	..	35.3	47.8	0.0	15 36 47.70	— 0 24.77	. .	.07	15 36 44.00	+ 8.89	
	42	ζ Ursæ Minoris	15.8	17.8	19.8	21.4	22.5	23.6	25.7	15 49 20.94	+ 0 0.75	. .	.09	15 49 42.78	— 10.27	
	43	β¹ Scorpii	..	44.8	58.3	11.9	24.9	38.1	51.3	15 56 18.22	— 0 6.23	. .	.10	15 56 33.09	+ 10.33	
	44	δ Ophiuchi	20.7	33.5	46.1	58.9	11.0	23.6	36.1	16 5 58.56	+ 0 0.41	. .	.12	16 6 20.09	9.31	
	45	α Scorpii	58.7	13.0	27.0	..	..	..	..	16 19 12.90	28.32	. .	.15	16 20 2.37	+ 10.76	
	46	ε Ursæ Minoris	57.8	..	6.7	..	..	..	..	17 58 32.25	3 7.44	. .	.22	17 2 0.91	— 28.59	
14	47	12 Can. Ven.	38.0	54.5	10.6	26.4	42.8	58.7	15.0	12 48 26.64	+ 0 0.41	. .	23.25	12 48 50.30	+ 9.86	
	48	Polaris, S. P.	23.5	..	12.5	..	54.5	53.0	56.5	13 7 16.00	— 3 14.29	. .	.28	13 4 24.99	33.42	
	49	α Virginis	..	18.3	31.3	44.0	56.7	9.0	22.2	13 16 50.25	— 0 5.97	. .	.30	13 17 7.58	10.20	
	50	η Ursæ Majoris	6.8	26.7	46.2	5.7	25.0	44.6	4.0	13 41 5.57	+ 0 0.43	. .	.34	13 41 29.34	8.21	
	51	α Cor. Bor.	6.2	20.7	34.8	48.8	2.7	16.6	30.9	15 27 48.67	.40	. .	.53	15 28 12.60	7.65	
	52	α Serpentis	42.0	55.0	7.7	20.2	32.7	45.0	57.9	15 36 20.07	+ 0 0.40	. .	+ 23.54	15 36 44.01	+ 8.90	

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 13h.	0s.
	s.	s.	s.	s.	
July 9	—0.576	+0.428	0.000	f 13.32	g .034
" 10	.463	.300	.000	13.48	l .098
" 11	.463	.300	.000	15.39	.112
" 13	—0.463	+0.300	0.000	20.80	.104
" 14	+0.272	—0.039	+0.130	23.27	l .104

5, 6, 7. +0s.36 applied to correction for clock error.
24, 25, 26. —0s.36 applied to correction for clock error.
35, 36, 37. For these observations $m = -.597$, $n = +.463$, $c = +.130$.

E. 6.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
14	1	ζ Ursæ Minoris	46.3	48.0	50.8	52.2	53.0	54.0	56.3	15 49 51.51	+ 0 0.76	. .	— 10.48	15 49 41.79	— 10.17	K.
	2	β¹ Scorpii	..	16.3	29.9	43.0	56.2	9.4	22.8	15 56 49.60	— 0 6.23	. .	.48	15 56 32.89	+ 10.34	
	3	δ Ophiuchi	52.2	4.9	17.7	30.1	42.6	55.0	7.6	16 6 30.01	+ 0 0.41	. .	.47	16 6 19.95	9.32	
	4	α Scorpii	30.0	44.5	58.7	12.5	26.3	40.0	54.1	16 20 12.30	+ 0 0.44	. .	.46	16 20 2.28	10.77	
	5	η Draconis	..	..	..	7.3	33.8	0.0	26.6	16 22 46.93	— 0 39.36	. .	.45	16 21 57.12	+ 1.09	
	6	ε Ursæ Minoris	28.0	3.0	36.7	11.0	43.0	..	..	17 0 36.34	+ 1 33.89	. .	.42	17 1 59.81	— 28.48	
	7	α Herculis	11.8	24.9	38.0	50.8	3.8	16.7	29.7	17 7 50.81	0.40	. .	.42	17 7 40.79	+ 7.77	
	8	λ Ursæ Minoris	..	33.0	4.0	30.0	46.0	..	..	20 12 13.25	+ 5 14.40	. .	.26	20 17 17.39	—252.68	
15	†9	Polaris, S. P.	..	..	51.0	39.5	34.0	33.0	34.1	13 12 38.32	— 7 58.41	. .	9.39	13 4 30.52	+ 32.55	
	†10	α Virginis	..	50.8	3.9	16.5	29.1	41.6	54.5	13 17 22.73	— 0 6.01	. .	.39	13 17 7.33	10.21	
	11	α Cor. Bor.	54.3	8.6	22.8	36.9	51.0	4.7	19.0	15 28 36.76	+ 0 0.39	. .	24.49	15 28 12.66	7.66	
	12	α Serpentis	30.1	43.0	55.7	8.3	20.7	33.2	45.9	15 37 8.13	.38	. .	.49	15 36 44.02	+ 8.91	
	13	ζ Ursæ Minoris	0.0	2.1	4.5	6.0	7.0	7.8	9.5	15 50 5.27	.92	. .	.47	15 49 41.72	— 10.08	
	14	δ Ophiuchi	6.3	18.8	31.7	43.9	56.6	8.8	21.6	16 6 43.96	.38	. .	.46	16 6 19.88	+ 9.33	
	15	α Scorpii	44.3	58.6	12.4	26.5	40.2	54.0	8.2	16 20 26.31	+ 0 0.39	. .	.44	16 20 2.26	10.78	
	16	η Draconis	..	..	54.3	21.3	47.5	13.7	40.0	16 22 47.36	— 0 25.85	. .	.44	16 21 57.07	+ 1.11	
	17	ε Ursæ Minoris	40.5	15.5	50.3	24.0	56.8	28.0	..	17 1 36.02	+ 0 47.81	. .	.40	17 1 59.43	— 28.40	
	18	α Herculis	25.8	38.8	52.0	5.2	17.7	30.5	43.6	17 8 4.80	0.38	. .	.39	17 7 40.79	+ 7.78	
	19	λ Ursæ Minoris	..	44.0	15.0	..	..	..	..	20 1 59.50	+15 41.13	. .	.19	20 17 16.54	—253.04	
23	20	Venus, 2d L.	..	..	..	..	..	13.2	27.1	5 42 20.15	— 0 33.34	— 0.47	12.93	5 41 33.52	. .	
24	21	Polaris, S. P.	59.5	2.0	49.5	..	33.5	31.0	33.5	13 4 44.83	+ 0 1.87	. .	10.97	13 4 35.73	+ 25.17	
	22	α Virginis	39.4	52.3	5.2	18.0	30.7	43.2	56.0	13 17 17.83	0 0.61	. .	.96	13 17 7.48	10.31	
	23	α Bootis	10.6	24.0	37.5	50.8	4.0	17.2	30.6	14 8 50.67	.46	. .	.91	14 8 40.22	8.91	
	24	α Aquilæ	51.6	4.4	17.1	29.9	42.4	54.9	7.7	19 43 29.71	.52	. .	.56	19 43 19.67	8.07	
	25	α² Capricorni	5.3	18.4	31.3	44.2	57.0	9.9	22.8	20 9 44.13	+ 0 0.66	. .	.53	20 9 34.26	+ 9.48	
	26	λ Ursæ Minoris	0.5	38.5	10.5	34.5	52.0	15.5	47.0	20 17 28.36	— 0 6.95	. .	.52	20 17 10.90	—251.91	
	27	α Cygni	31.8	49.7	7.5	25.0	42.4	59.9	17.9	20 36 24.89	+ 0 0.16	. .	.50	20 36 14.55	+ 4.42	
	28	ζ Cygni	53.2	8.0	22.4	36.8	51.0	5.4	20.0	21 6 36.80	.34	. .	.47	21 6 26.67	6.55	
	29	α Ursæ Majoris, S. P.	58.0	25.5	52.3	19.3	46.7	14.1	41.7	22 54 19.66	+ 0 1.36	. .	.36	22 54 10.66	15.28	
	30	γ Cephei	37.2	33.8	28.0	22.8	17.1	11.0	6.9	23 33 22.40	— 0 0.25	. .	.31	23 33 11.84	2.01	
	31	Polaris	3.0	8.0	5.0	..	..	..	..	0 49 5.33	+15 43.84	. .	.18	1 4 38.99	25.10	
29	32	η Ophiuchi	3.0	16.2	29.2	42.1	55.0	7.4	21.0	17 1 41.99	0.68	. .	5.85	17 1 36.82	10.10	A.
	33	α Herculis	7.2	20.3	33.2	46.4	59.1	11.8	24.8	17 7 46.12	.47	. .	.86	17 7 40.75	7.89	
	34	ϑ Ophiuchi	1.1	15.1	29.1	42.9	56.5	9.6	23.5	17 12 42.54	.76	. .	.86	17 12 37.44	10.76	
	35	λ Herculis	57.3	11.7	25.4	39.6	53.2	7.0	21.0	17 24 39.31	.37	. .	.86	17 24 33.82	6.77	
	36	α Ophiuchi	17.2	30.1	43.1	56.0	8.6	21.1	34.0	17 27 55.73	.48	. .	.86	17 27 50.35	7.95	
	37	β Ophiuchi	22.9	35.5	48.2	0.8	13.2	25.2	38.1	17 36 0.56	.54	. .	.86	17 35 55.24	8.52	
	38	γ Draconis	9.6	29.9	50.1	10.0	30.0	50.3	10.1	17 53 10.00	.05	. .	.87	17 53 4.18	2.78	
	39	μ¹ Sagittarii	2.0	15.6	29.1	42.5	56.0	9.0	22.4	18 4 42.37	.74	. .	.87	18 4 37.24	+ 10.35	
	40	δ Ursæ Minoris	39.0	13.5	45.8	16.0	46.0	13.0	..	18 20 28.88	1 43.47	. .	.87	18 22 6.48	— 82.44	
	†41	α Lyræ	3.8	20.2	36.2	52.2	7.9	23.8	39.5	18 31 51.94	.24	. .	.88	18 31 46.30	+ 4.96	
	42	β Lyræ	47.4	2.3	17.6	32.7	47.1	2.2	17.1	18 44 32.34	.30	. .	.88	18 44 26.76	5.60	
	43	ζ Aquilæ	49.9	2.9	15.9	28.9	41.6	54.2	7.2	18 58 28.66	.47	. .	.88	18 58 23.25	7.54	
	44	η Lyræ	51.3	7.8	23.9	39.7	55.8	11.3	27.5	19 8 39.61	+ 0 0.24	. .	.89	19 8 32.97	+ 4.81	
	45	δ Draconis	..	..	7.3	39.9	12.1	44.2	17.0	19 13 12.10	— 0 32.03	. .	.89	19 12 33.18	— 3.57	
	46	δ Aquilæ	15.1	27.9	40.8	53.0	5.5	17.7	30.7	19 17 52.96	+ 0 0.55	. .	.89	19 17 47.62	+ 8.44	
	47	α Aquarii	23.8	36.2	48.0	1.2	13.9	26.0	38.9	21 58 1.14	.58	. .	.93	21 57 55.80	8.73	
	48	Saturn, 1st L.	17.7	30.8	43.6	56.7	9.4	22.0	35.1	22 6 56.47	.67	+ 0.62	.93	22 6 51.84	. .	
30	49	ζ Aquilæ	50.7	3.9	16.8	29.7	42.4	55.0	7.9	18 58 29.49	+ 0 0.47	. .	6.50	18 58 23.46	7.54	K.
	50	γ Aquilæ	..	40.4	53.3	5.9	18.7	30.3	44.0	19 39 12.10	— 0 5.88	. .	.51	19 38 59.72	7.82	
	51	α Aquilæ	..	0.6	13.4	25.8	38.6	51.0	3.9	19 43 32.22	— 0 6.18	. .	.51	19 43 19.87	+ 8.05	
	52	λ Ursæ Minoris	3.0	40.0	..	..	..	..	..	19 51 21.50	+26 2.52	. .	— 6.52	20 17 17.51	—250.94	

9. Star very unsteady and ill defined.
May 15. 13*h*. 30*m*. S. T., clock adjusted.
9, 10. Correction for clock error brought forward from the 13th.

DATE.		VALUE OF			CLOCK.	H. Rate.
		m.	*n*.	*c*.	At 15*h*.	0*s*.
		s.	s.	s.	s.	
July	14	+0.272	—0.031	+0.130	*f* 10.53	*l* .051
"	15	.241	.008	.130	24.52	.063
"	23	.502	+0.324	.000	12.03	.063
"	24	.572	—0.411	.000	10.85	.063
"	29	.572	.411	.000	5.82	*g* .015
"	30	+0.572	—0.411	.000	6.47	*g* .008

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. s.	M. s.	s.	s.	H. M. s.	s.	
July 30	1	61¹ Cygni	22.3	38.3	54.5	10.3	26.0	41.7	57.8	21 0 10.13	+ 0 0.24	. .	— 6.52	21 0 3.85	+ 6.98	K.
	2	ζ Cygni	49.6	4.2	18.6	33.1	47.3	1.8	16.0	21 6 32.94	0.33	. .	.52	21 6 26.75	6.49	
	3	Polaris	13.0	..	13.0	..	..	..	..	0 49 13.00	15 34.38	. .	.56	1 4 40.82	20.16	
	†4	Venus, 2d L.	37.8	51.6	5.3	19.0	32.5	45.8	59.4	6 17 18.77	0.40	— 0.45	.23	6 17 12.49	. .	A.
	†5	α Canis Minoris . . .	43.4	56.1	8.8	21.3	34.0	46.2	59.0	7 31 21.26	.53	. .	.24	7 31 15.55	11.39	
	†6	β Geminorum . . .	17.3	31.6	46.1	0.3	14.5	28.6	42.9	7 36 0.19	+ 0 0.35	. .	.24	7 35 54.30	13.37	
31	†7	Sun, 2d L.	..	..	..	4.2	..	30.3	43.5	8 43 26.00	— 0 21.71	— 66.66	.19	8 41 51.44	. .	
	†8	Mercury	41.2	54.1	6.8	19.3	32.1	44.6	57.1	10 25 19.31	+ 0 0.35	. .	.20	10 25 13.46	. .	
	9	α² Libræ	51.8	4.9	17.9	30.8	43.6	56.5	9.6	14 42 30.73	.42	. .	.24	14 42 24.91	10.40	
	10	Moon, 1st L.	13.8	27.3	40.8	54.1	7.3	20.4	34.0	14 47 53.96	.42	+ 66.45	.24	14 48 54.59	. .	
	11	β Libræ	14.1	27.0	39.8	52.3	4.9	17.4	30.2	15 8 52.24	.48	. .	.24	15 8 46.48	10.02	
	12	γ Libræ	25.4	38.3	51.2	4.1	17.0	29.8	42.8	15 27 4.09	.41	. .	.24	15 26 58.26	10.29	
	13	α Serpentis	12.0	24.4	37.3	50.0	2.5	14.8	27.7	15 36 49.81	+ 0 0.35	. .	.24	15 36 43.92	+ 9.09	
	14	ζ Ursæ Minoris . . .	..	..	45.7	47.2	48.2	49.3	51.4	15 50 48.36	— 1 1.99	. .	.25	15 49 40.12	— 8.49	
	15	ε Ursæ Minoris . . .	24.5	59.0	32.0	6.2	38.0	9.6	44.0	17 2 4.76	+ 0 0.83	. .	.26	17 1 59.33	— 26.00	
	16	β Draconis	4.2	25.0	45.5	6.1	26.5	46.7	7.3	17 27 5.90	.16	. .	.26	17 26 59.80	+ 2.89	
	17	β Ophiuchi	23.3	36.1	48.8	1.5	13.8	26.3	38.8	17 36 1.23	.36	. .	.26	17 35 55.33	8.53	
	18	ξ Draconis	51.6	14.8	37.9	0.9	23.7	46.2	9.3	17 51 0.63	0.12	. .	.26	17 50 54.49	+ 1.46	
	19	δ Ursæ Minoris . . .	39.0	12.9	46.0	16.0	45.8	13.5	..	18 20 28.87	1 43.16	. .	.27	18 22 5.76	— 81.96	
	20	α Lyræ	4.3	20.6	36.9	52.6	8.7	24.2	40.5	18 31 52.54	0.24	. .	.27	18 31 46.51	+ 4.98	
	21	ζ¹ Lyræ	49.8	5.5	21.8	37.3	53.1	8.7	24.2	18 39 37.20	.25	. .	.27	18 39 31.18	5.06	
	22	β Lyræ	47.8	3.0	17.9	32.9	47.8	2.7	17.6	18 44 32.81	.26	. .	.27	18 44 26.80	5.61	
Aug. 1	23	Sun, 1st L.	4.9	18.2	31.5	44.7	57.7	10.8	24.3	8 42 44.59	.32	. .	.73	8 44 44.68	. .	K.
	24	Sun, 2d L.	17.9	31.2	44.6	57.8	10.8	23.7	37.2	8 46 57.60	.32					
	25	α Herculis	8.0	21.0	34.0	47.0	59.8	12.7	25.8	17 7 46.86	.33	. .	.80	17 7 40.39	7.92	
	26	α Ophiuchi	18.0	31.0	44.0	56.9	9.7	22.3	35.2	17 27 56.73	+ 0 0.33	. .	.80	17 27 50.26	7.98	
	27	ι Herculis	..	..	58.4	16.3	34.4	52.2	10.5	17 35 34.36	— 0 17.89	. .	.80	17 35 9.67	4.17	
	28	γ Ophiuchi	..	55.0	7.7	20.3	32.6	44.9	57.7	17 40 20.08	+ 0 0.36	. .	.80	17 40 13.64	8.65	
	29	Serpentis, (6049) . .	1.8	14.8	27.8	40.3	53.0	5.6	18.6	17 44 40.27	.40	. .	.80	17 44 33.87	9.63	
	30	Herculis, (6073) . .	40.0	54.0	8.2	22.0	35.8	49.8	3.7	17 49 21.93	.29	. .	.80	17 49 15.42	6.66	
	31	γ Draconis	10.5	30.7	51.3	11.1	31.0	50.9	11.0	17 53 10.93	.16	. .	.80	17 53 4.29	2.84	
	32	Ophiuchi, (6143) . .	34.4	57.3	0.3	12.7	25.3	37.8	50.6	18 0 12.63	0.34	. .	.80	18 0 6.17	8.05	
	33	μ¹ Sagittarii	..	..	30.4	..	..	..	..	18 4 30.40	13.73	. .	.80	18 4 37.33	+ 10.36	
	34	δ Ursæ Minoris . . .	38.0	11.5	46.0	16.5	46.5	14.5	..	18 20 28.83	+ 1 43.18	. .	.81	18 22 5.20	— 81.69	
	35	β Lyræ	..	..	..	..	48.3	..	..	18 44 48.30	— 0 14.66	. .	.81	18 44 26.83	+ 5.62	
2	36	Venus, 2d L.	0.8	14.6	28.2	41.8	55.2	8.8	22.4	6 32 41.68	+ 0 0.30	— 0.45	.51	6 32 35.02	. .	A.
3	37	Sun, 1st L.	49.8	3.0	16.2	29.7	42.6	55.5	8.7	8 52 29.36	.32	. .	.64	8 53 29.47	. .	
	38	Sun, 2d L.	2.7	15.9	29.2	42.4	55.4	8.4	21.6	8 54 42.23	.32					
	39	η Ophiuchi	3.8	16.8	30.0	43.0	55.8	8.5	21.7	17 1 42.80	.42	. .	.68	17 1 36.54	10.15	
	40	α Herculis	8.1	21.0	34.1	47.0	0.1	12.6	25.8	17 7 46.96	.32	. .	.69	17 7 40.59	7.95	
	41	ϑ Ophiuchi	2.2	15.8	29.8	43.7	57.2	10.9	24.8	17 12 43.49	.44	. .	.69	17 12 37.24	10.81	
	42	α Ophiuchi	18.0	31.0	43.9	56.8	9.2	22.2	35.0	17 27 56.59	.33	. .	.69	17 27 50.23	7.99	
	43	β Ophiuchi	23.7	36.2	49.0	1.6	14.2	26.2	37.1	17 36 1.14	.36	. .	.69	17 35 54.81	8.56	
	44	Moon, 1st L.	0.6	14.7	28.4	42.3	56.0	9.2	23.4	17 45 42.09	.45	+ 71.87	.69	17 46 47.72	. .	
	45	α Lyræ	4.7	21.0	37.1	53.2	9.0	25.0	40.9	18 31 52.99	.24	. .	.69	18 31 46.54	5.01	
	46	ζ¹ Lyræ	50.5	6.2	22.1	37.9	53.6	9.1	25.0	18 39 37.77	.25	. .	.69	18 39 31.33	5.09	
	47	β Lyræ	48.1	3.2	18.4	33.5	48.2	3.0	17.9	18 44 33.19	.26	. .	.69	18 44 26.76	5.63	
	48	η Lyræ	52.3	8.2	24.6	40.8	56.7	12.8	28.7	19 8 40.59	.24	. .	.70	19 8 34.13	4.84	
	49	ρ¹ Sagittarii	15.0	28.1	41.2	54.4	7.5	20.7	33.9	19 12 54.40	.42	. .	.70	19 12 48.12	9.93	
	50	δ Aquilæ	16.3	28.9	41.4	54.0	6.6	18.9	31.4	19 17 53.93	.36	. .	.70	19 17 47.59	8.44	
	51	β¹ Cygni	58.0	12.4	26.4	40.6	54.6	8.4	23.0	19 24 40.49	.28	. .	.70	19 24 34.07	6.23	
	52	Sagittarii, (6742) . .	13.3	26.6	39.7	52.9	5.5	18.6	31.9	19 33 52.64	+ 0 0.42	. .	— 6.70	19 33 46.36	— 9.75	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 15h.	H. Rate. 0s.
	s.	s.	s.	s.	
July 30	+0.572	—0.411	0.000	*f* 6.47	*g* .008
" 31	.372	.163	.000	6.24	.008
Aug. 1	.372	.163	.000	6.79	.008
" 2	.372	.163	.000	6.55	.005
" 3	+0.372	—0.163	0.000	6.67	*g* .005

7. Passing clouds over the Sun.
8. Observed the centre of Mercury.
4, 5, 6. +0s.36 applied to correction for clock error.

E. 6.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to **1850.0**	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
3	1	γ Aquilæ	27.9	40.9	53.3	6.5	18.9	31.6	44.1	19 39 6.17	+ 0 0.34	. .	— 6.70	19 38 59.81	+ 7.81	A.
	2	α Aquilæ	47.9	0.7	13.3	26.1	38.4	51.0	4.1	19 43 25.93	.35	. .	.70	19 43 19.58	8.04	
	3	β Aquilæ	17.0	29.8	42.1	55.0	7.2	19.9	32.4	19 47 54.77	.35	. .	.70	19 47 48.42	8.13	
	4	ϑ Aquilæ	53.9	6.4	18.8	31.5	44.0	56.2	8.9	20 3 31.39	.37	. .	.70	20 3 25.06	8.64	
	5	β^2 Capricorni	52.3	5.2	18.2	31.3	44.2	57.3	10.1	20 12 31.23	+ 0 0.42	. .	.70	20 12 24.95	+ 9.55	
	6	λ Ursæ Minoris	..	..	7.5	30.0	49.0	7.0	42.5	20 27 51.20	—10 35.88	. .	.70	20 17 8.62	—249.76	
	7	61^1 Cygni	22.6	38.6	54.3	10.6	26.1	41.9	58.0	21 0 10.30	+ 0 0.24	. .	.70	21 0 3.84	+ 6.74	
4	8	Sun, 1st L.	42.1	55.4	8.8	21.8	34.7	47.8	1.2	8 56 21.69	.32	. .	7.14	8 57 21.17	. .	K.
	9	Sun, 2d L.	54.7	8.2	21.4	34.3	47.3	0.4	13.7	8 58 34.29	.32					
	10	α Herculis	8.3	21.8	34.7	47.6	0.5	13.4	26.4	17 7 47.53	.33	. .	.19	17 7 40.67	7.96	
	11	α Ophiuchi	18.5	31.7	44.7	57.4	10.1	22.8	35.7	17 27 57.27	.33	. .	.19	17 27 50.41	8.01	
	12	γ Draconis	11.0	31.4	51.7	11.8	31.6	51.5	11.8	17 53 11.54	.16	. .	.19	17 53 4.51	2.90	
	13	μ^1 Sagittarii	3.0	17.2	30.6	44.2	57.2	10.4	24.3	18 4 43.84	.44	. .	.19	18 4 37.09	+ 10.39	
	14	δ Ursæ Minoris	37.5	13.5	..	17.5	44.0	14.5	..	18 20 49.40	1 22.13	. .	.19	18 22 4.34	— 80.76	
	15	λ Sagittarii	57.0	11.0	24.9	38.9	52.8	6.4	20.3	18 18 38.76	0 0.45	. .	.19	18 18 32.02	+ 10.69	
	16	α Lyræ	5.1	21.4	37.7	53.6	9.5	25.4	41.6	18 31 53.47	.24	. .	.19	18 31 46.52	5.02	
	17	β Lyræ	..	..	19.1	34.0	48.8	..	..	18 44 33.96	+ 0 0.15	. .	.19	18 44 26.92	5.64	
	18	σ Sagittarii	..	25.7	40.1	54.0	7.8	21.8	35.7	18 46 0.85	— 0 6.57	. .	.19	18 45 47.09	10.60	
	19	Moon, 1st L.	10.4	24.4	38.3	51.8	5.2	18.7	32.7	18 49.51.64	+ 0 0.42	+ 72.46	.19	18 50 57.33	. .	
	20	π Sagittarii	6.6	20.2	33.7	47.2	0.6	13.8	27.4	19 0 47.07	.44	. .	.19	19 0 40.32	10.21	
	21	δ Aquilæ	16.7	29.6	42.0	54.7	7.0	19.6	32.3	19 17 54.56	+ 0 0.36	. .	.20	19 17 47.72	+ 8.45	
	22	λ Ursæ Minoris	57.0	32.0	3.5	32.0	50.0	11.0	45.5	20 17 24.43	— 0 7.75	. .	.20	20 17 9.48	—249.29	
	23	61^1 Cygni	23.0	..	55.1	..	26.8	..	58.6	21 0 10.87	+ 0 0.24	. .	.20	21 0 3.91	+ 6.73	
	24	61^2 Cygni	..	40.6	..	12.4	..	43.9	..	21 0 12.30	.24	. .	.20	21 0 5.34	6.71	
	†25	Venus, 2d L.	17.4	31.2	44.9	58.5	11.8	25.3	38.9	6 42 58.29	.30	— 0.45	6.89	6 42 51.25	. .	A.
5	26	Sun, 1st L.	32.7	46.1	59.4	12.2	25.5	38.0	51.5	9 0 12.20	.32	. .	.86	9 1 11.91	. .	
	27	Sun, 2d L.	45.1	58.4	11.7	24.9	37.9	50.9	4.1	9 2 24.71	.32					
	28	ρ^1 Sagittarii	15.1	28.4	41.8	54.9	7.7	20.8	34.1	19 12 54.69	.42	. .	.88	19 12 48.23	9.94	
	29	δ Aquilæ	16.3	29.1	41.6	54.2	6.4	19.0	31.8	19 17 54.06	.36	. .	.88	19 17 47.54	8.45	
	30	β^1 Cygni	58.1	12.5	26.7	40.9	54.9	8.7	22.9	19 24 40.67	.28	. .	.88	19 24 34.07	6.24	
	31	Sagittarii, (6742)	13.5	26.5	39.9	52.9	5.9	18.8	32.0	19 33 52.79	.42	. .	.88	19 33 46.33	9.75	
	32	γ Aquilæ	28.0	41.0	53.9	6.3	19.1	31.3	44.4	19 39 6.29	.34	. .	.88	19 38 59.75	7.81	
	33	α Aquilæ	48.2	0.9	13.5	26.6	39.0	51.3	4.2	19 43 26.24	.35	. .	.88	19 43 19.71	8.05	
	34	Moon, 1st L.	41.8	55.4	9.0	22.3	35.8	49.0	2.8	19 54 22.30	.42	+ 72.20	.88	19 55 28.04	. .	
	35	α^2 Capricorni	2.2	15.1	27.9	41.0	53.6	6.2	19.4	20 9 40.77	.41	. .	.88	20 9 34.30	9.42	
	36	ε Aquarii	52.1	5.2	18.0	30.7	43.0	55.7	8.4	20 39 30.44	.40	. .	.88	20 39 23.96	9.16	
	37	μ Aquarii	52.8	5.6	18.3	31.0	43.7	56.1	9.0	20 44 30.93	.40	. .	.88	20 44 24.45	9.11	
	38	61^1 Cygni	22.7	38.8	54.8	10.6	26.7	42.1	58.0	21 0 10.53	0.24	. .	.88	21 0 3.89	6.87	
6	39	α Ophiuchi	18.8	31.9	44.7	57.3	10.4	..	35.9	17 27 53.17	4.59	. .	7.42	17 27 50.34	8.03	K.
	40	μ^1 Sagittarii	3.8	17.4	30.8	44.4	57.7	10.8	24.6	18 4 44.21	+ 0 0.44	. .	.42	18 4 37.23	+ 10.40	
	41	δ Ursæ Minoris	36.5	12.0	..	15.5	44.0	14.0	46.0	18 22 48.00	— 0 37.17	. .	.43	18 22 3.40	— 80.14	
	42	β Libræ	48.8	4.0	19.2	34.2	49.0	3.7	18.7	18 44 33.94	+ 0 0.26	. .	.43	18 44 26.77	+ 5.66	
	43	ζ Aquilæ	51.6	4.7	17.7	30.4	43.4	55.8	9.1	18 58 30.39	.41	. .	.43	18 58 23.37	7.57	
	44	δ Aquilæ	16.7	29.6	42.2	54.7	7.0	19.7	32.2	19 17 54.59	.36	. .	.43	19 17 47.52	8.45	
	45	α Aquilæ	48.7	1.4	14.3	26.8	39.5	52.0	4.7	19 43 26.77	.35	. .	.44	19 43 19.68	8.05	
	46	β Aquilæ	17.6	30.4	43.1	55.8	8.0	20.5	33.1	19 47 55.50	0.39	. .	.44	19 47 48.45	+ 8.13	
	47	λ Ursæ Minoris	58.0	..	..	..	..	8.0	..	20 12 3.00	5 12.87	. .	.44	20 17 8.43	—248.20	
	48	α Cygni	28.8	46.6	4.4	22.1	39.4	57.0	14.7	20 36 21.86	+ 0 0.21	. .	.44	20 36 14.63	+ 4.36	
	49	ε Aquarii	..	..	..	..	..	..	9.0	20 40 9.00	— 0 38.12	. .	.45	20 39 23.43	9.15	
	50	Moon, 1st L.	16.7	30.0	43.4	56.7	9.7	22.8	36.0	20 57 56.47	+ 0 0.41	. .	.45	20 59 0.73	. .	
	†51	Moon, 2d L.	39.3	52.7	6.2	19.3	32.3	45.5	58.8	21 0 19.16	.41					
	52	ζ Cygni	50.5	5.0	19.6	34.0	48.2	2.3	17.0	21 6 33.80	+ 0 0.27	. .	— 7.45	21 6 26.62	+ 6.43	

25. +0s.36 applied to correction for clock error.
51. Correction for imperfect illumination —0s.08.

DATE.	VALUE OF m.	n.	c.	CLOCK. At	H. Rate. 0s.
	s.	s.	s.	s.	
Aug. 3	+0.372	—0.163	0.000	f 6.67	g .005
" 4	.372	.163	.000	7.18	.005
" 5	.372	.163	.000	6.86	.002
" 6	—0.372	—0.163	0.000	7.40	g .008

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	S.	S.	H. M. S.	S.	
Aug. 6	1	β Aquarii	59.8	12.4	25.2	37.8	50.2	2.6	15.3	21 23 37.61	+ 0 0.39	. .	− 7.45	21 23 30.55	+ 8.87	K.
	†2	Venus, 2d L.	34.3	48.0	1.9	15.2	28.8	42.1	55.9	6 53 15.17	.30	− 0.45	.17	6 53 7.85	. . .	A.
7	3	Sun, 1st L.	12.8	26.2	39.4	52.5	5.3	18.2	31.4	9 7 52.26	.32	. .	6.88	9 8 51.80	. .	
	4	Sun, 2d L.	25.1	38.2	51.3	4.9	17.7	30.4	43.6	9 10 4.46	.32					
8	5	Sun, 1st L.	2.2	15.5	28.8	41.6	54.2	7.6	20.7	9 11 41.51	.32	. .	.70	9 12 41.09	. . .	
	6	Sun, 2d L.	14.2	27.4	40.4	53.4	6.6	19.7	32.3	9 13 53.43	+ 0 0.32					
	7	δ Ursæ Minoris	38.0	9.5	44.5	15.5	44.5	12.5	44.5	18 22 12.71	− 0 2.37	. .	.61	18 22 3.73	− 79.57	
	8	ε Pegasi	9.4	22.0	34.8	47.2	0.1	12.4	25.3	21 36 47.31	+ 0 0.34	. .	.59	21 36 41.06	+ 8.05	
	9	α Aquarii	..	37.5	50.0	2.4	15.0	27.2	39.8	21 58 8.65	− 0 5.91	. .	.58	21 57 56.16	8.60	
	10	Saturn, 1st L.	..	..	5.3	18.1	30.9	43.7	56.6	22 4 30.92	12.49	+ 0.62	.58	22 4 12.47	. .	
10	11	Polaris, S. P.	..	..	..	51.0	..	52.0	51.0	13 18 11.33	−13 3.60	. .	7.40	13 5 0.33	12.10	K.
	12	γ Draconis	11.0	31.6	51.8	11.9	32.0	51.7	12.0	17 53 11.71	+ 0 0.16	. .	.45	17 53 4.42	3.04	
	13	μ^1 Sagittarii	3.6	17.4	30.7	44.3	57.7	10.8	24.3	18 4 44.11	+ 0 0.44	. .	.46	18 4 37.09	+ 10.43	
	14	δ Ursæ Minoris	..	..	..	15.0	44.5	13.0	..	18 25 44.17	− 3 33.67	. .	.46	18 22 3.04	− 79.05	
	15	α Lyræ	..	..	..	..	..	..	41.8	18 32 41.80	− 0 47.80	. .	.46	18 31 46.54	+ 5.09	
	16	β Lyræ	49.0	4.3	19.2	34.2	48.9	3.8	19.0	18 44 34.06	+ 0 0.26	. .	.46	18 44 26.86	5.70	
	17	ζ Aquilæ	51.8	4.7	17.7	30.5	43.4	56.0	8.9	18 58 30.43	.53	. .	.47	18 58 23.29	7.59	
	18	η Lyræ	53.0	9.5	25.7	41.7	57.7	13.5	29.8	19 8 41.56	+ 0 0.24	. .	.47	19 8 34.33	4.91	
	19	δ Aquilæ	..	29.6	42.2	54.7	7.2	19.7	32.0	19 18 0.90	− 0 5.83	. .	.47	19 17 47.60	8.46	
	20	γ Aquilæ	28.5	41.6	54.0	6.8	19.7	32.0	45.0	19 39 6.80	+ 0 0.34	. .	.48	19 38 59.66	7.82	
	21	α Aquilæ	48.7	1.5	14.3	26.8	39.6	52.0	4.6	19 43 26.79	.35	. .	.48	19 43 19.66	8.05	
	22	β Aquilæ	17.8	30.6	43.0	55.7	8.2	20.7	33.4	19 47 55.63	.35	. .	.48	19 47 48.50	8.02	
	23	α^2 Capricorni	2.7	15.7	28.6	41.6	54.2	7.0	20.0	20 9 41.40	.41	. .	.48	20 9 34.33	+ 9.39	
	24	λ Ursæ Minoris	..	..	3.5	31.0	..	..	..	20 12 17.25	4 58.10	. .	.48	20 17 7.87	−246.53	
	†25	Venus, 2d L.	8.8	22.7	36.2	49.4	3.0	16.3	30.1	7 13 49.50	0 0.44	− 0.45	.25	7 13 42.24	. .	A.
	†26	α Canis Minoris	44.6	57.3	9.9	22.7	35.0	47.6	0.3	7 31 22.49	.35	. .	.26	7 31 15.58	+ 11.20	
11	27	Sun, 1st L.	26.4	39.8	52.9	5.7	18.8	31.5	44.8	9 23 5.70	+ 0 0.32	. .	.24	9 24 4.49	. .	
	28	Sun, 2d L.	..	..	..	17.1	30.2	43.1	56.3	9 25 36.65	− 0 19.20					
	29	β Capricorni	53.1	6.0	19.1	32.2	44.6	57.9	11.0	20 12 31.99	+ 0 0.42	. .	.32	20 12 25.09	9.52	
12	30	ε Pegasi	..	..	..	48.7	1.1	13.8	26.7	21 37 7.58	− 0 18.68	. .	.89	21 36 41.01	8.02	K.
	31	α Aquarii	25.8	38.8	51.3	3.7	16.2	28.4	41.3	21 58 3.64	+ 0 0.37	. .	.90	21 57 56.11	8.55	
	32	Saturn, 1st L.	33.0	46.3	..	12.0	..	..	..	22 2 50.43	21.88	. .	.90	22 3 5.03	. .	
	33	Saturn, 2d L.	34.2	47.5	..	13.3	26.0	..	51.8	22 3 10.56	2.99					
	34	ζ Pegasi	19.9	32.9	45.9	58.3	11.0	23.4	36.4	22 33 58.26	0.34	. .	.90	22 33 50.70	8.19	
	35	α Piscis Aust.	35.1	50.0	4.9	19.2	33.6	47.9	2.6	22 49 19.04	.46	. .	.90	22 49 11.60	9.54	
	36	α Pegasi	38.0	51.1	4.0	15.9	29.8	42.7	55.7	22 57 16.89	.33	. .	.90	22 57 9.32	8.17	
13	37	λ Herculis	59.0	13.3	27.2	41.2	54.9	8.8	22.7	17 24 41.01	.29	. .	.58	17 24 33.72	6.98	A.
	38	α Ophiuchi	18.9	32.0	44.8	57.6	10.3	23.0	35.8	17 27 57.49	.33	. .	.58	17 27 50.24	8.12	
	39	β Ophiuchi	24.4	37.2	49.9	2.4	14.9	27.3	40.0	17 36 2.30	.36	. .	.59	17 35 55.07	8.66	
14	40	Sun, 1st L.	46.9	59.8	13.1	26.1	38.8	51.6	4.7	9 34 25.86	.33	. .	.85	9 35 23.76	. .	K
	41	Sun, 2d L.	57.6	10.8	24.0	36.8	49.7	2.6	15.5	9 36 36.71	.33					
17	42	α Canis Minoris	45.8	58.8	11.4	23.9	36.4	49.0	1.7	7 31 23.86	.35	. .	8.40	7 31 15.81	11.07	A
	43	β Geminorum	20.0	34.5	48.8	2.9	17.0	31.0	45.4	7 36 2.80	.28	. .	.40	7 35 54.68	13.03	
	44	Venus, 2d L.	2.9	16.3	30.1	43.6	56.7	10.2	23.7	7 49 43.36	.31	− 0.43	.40	7 49 34.84	. .	
18	45	Venus, 2d L.	9.1	..	36.4	..	..	..	..	7 54 22.75	7.18	− 0.42	.62	7 54 40.89	. .	
20	46	Sun, 1st L.	11.9	25.2	38.0	50.9	3.4	16.2	29.5	9 56 50.73	0.33	. .	.70	9 57 47.44	. .	
	47	Sun, 2d L.	22.2	35.2	48.1	1.2	13.9	26.4	39.3	9 59 0.90	.33					
	48	α Aquilæ	50.0	2.8	15.5	28.1	40.8	53.0	5.9	19 43 28.01	.35	. .	.74	19 43 19.62	8.09	
	49	β Aquilæ	19.0	31.9	44.4	57.0	9.2	22.0	34.7	14 47 56.89	.35	. .	.74	19 47 48.50	8.15	
	50	ϑ Aquilæ	55.8	8.5	21.1	33.6	46.0	58.4	11.0	20 3 33.49	.37	. .	.74	20 3 25.12	8.65	
	51	α^2 Capricorni	4.0	17.0	29.8	42.6	55.5	8.0	21.0	20 9 42.56	.41	. .	.74	20 9 34.23	9.41	
	52	α Cygni	29.9	48.0	5.8	23.5	41.0	58.2	15.9	20 36 23.19	− 0 0.21	. .	− 8.74	20 36 14.66	+ 4.41	

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 18h.	0s.
	s.	s.	s.	s.	
Aug. 6	+0.372	−0.163	0.000	f 7.34	g .008
" 7	.372	.163	.000	6.87	.003
" 8	.372	.163	.000	6.72	l .009
" 10	.372	.163	.000	7.33	g .012
" 11	.372	.163	.000	7.22	.008
" 12	.372	.163	.000	7.78	.008
" 13	.372	.163	.000	7.55	.002
" 14	.372	.163	.000	7.84	.005
" 17	.372	.163	.000	8.40	.009
" 18	.372	.163	.000	8.62	.009
" 20	+0.372	−0.163	0.000	8.69	g .004

2, 25, 26. +0s.36 applied to correction for clock error.

TE. 46.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
21	1	Sun, 1st L.	54.7	7.7	20.4	..	..	..	..	10 0 7.57	+ 0 26.01	. .	− 8.80	10 1 29.72	. .	A.
	2	Sun, 2d L.	4.4	17.4	30.3	43.3	56.1	8.7	21.8	10 2 43.14	0.33					
30	3	Venus, 1st L.	35.7	49.2	2.3	15.6	28.7	41.8	54.9	8 55 15.46	.32	− 0.40	.30	8 55 7.08	. .	
31	4	Sun, 1st L.	35.0	47.9	0.5	13.2	25.9	38.3	51.2	10 37 13.17	.35	. .	.70	10 38 9.27	. .	
	5	Sun, 2d L.	43.9	56.7	9.5	22.1	34.8	47.3	0.2	10 39 22.07	.35					
	6	γ Draconis	12.1	32.9	52.9	13.0	32.9	52.8	13.1	17 53 12.81	.17	. .	.98	17 53 4.00	+ 3.64	
	7	μ^1 Sagittarii	5.0	18.5	32.1	45.4	58.8	11.9	25.4	18 4 45.30	.44	. .	.99	18 4 36.75	10.70	
	†8	Moon, 1st L.	30.2	44.2	57.9	11.5	25.1	38.9	52.3	18 20 11.44	.43	+ 71.03	9.00	18 21 13.90	. .	
	9	α Lyræ	6.7	22.9	39.0	55.1	10.8	26.9	42.9	18 31 54.90	.24	. .	.00	18 31 46.14	5.48	
	10	ζ^1 Lyræ	52.2	8.1	24.0	39.9	55.4	11.0	26.8	18 39 39.63	.24	. .	.01	18 39 30.86	5.53	
	11	β Lyræ	50.0	5.6	20.5	35.7	50.1	5.2	19.9	18 44 35.29	.26	. .	.01	18 44 26.54	6.06	
	12	ζ Aquilæ	53.0	6.0	19.1	32.0	44.7	57.4	10.1	18 58 31.76	.33	. .	.02	18 58 23.07	7.81	
	13	η Lyræ	54.2	10.6	26.8	42.9	58.9	14.6	30.7	19 8 42.67	+ 0 0.24	. .	.03	19 8 33.88	+ 5.23	
	14	δ Draconis	3.9	37.3	10.2	42.8	14.9	47.1	20.0	19 12 42.31	− 0 0.03	. .	.03	19 12 33.25	− 2.44	
	15	δ Aquilæ	18.1	31.0	43.7	56.2	8.6	21.0	33.5	19 17 56.01	+ 0 0.36	. .	.03	19 17 47.34	+ 8.63	
	16	ϵ^2 Sagittarii	15.5	28.8	41.8	54.8	7.8	20.9	33.9	19 33 54.79	.42	. .	.04	19 33 46.17	9.90	
	17	γ Aquilæ	30.1	43.0	55.9	8.6	21.1	33.8	46.4	19 39 8.41	.34	. .	.05	19 38 59.70	7.97	
	18	α Aquilæ	50.4	3.1	15.9	28.5	41.1	53.8	6.1	19 43 28.41	.35	. .	.05	19 43 19.71	8.19	
	19	β Aquilæ	19.1	31.9	44.8	57.2	9.8	22.2	35.0	19 47 57.14	+ 0 0.35	. .	.05	19 47 48.44	8.26	
1	20	Sun, 1st L.	..	..	38.9	52.0	4.2	16.9	29.9	10 41 4.38	− 0 12.33	. .	.31	10 41 47.08	. .	
	21	Sun, 2d L.	22.3	35.1	47.9	0.6	13.1	25.7	38.2	10 43 0.40	+ 0 0.33					
	22	η Lyræ	55.0	11.3	27.5	43.7	59.2	15.5	31.5	19 8 43.39	.24	. .	.63	19 8 34.00	5.25	
	23	ρ^1 Sagittarii	17.4	30.6	44.1	57.2	10.3	23.3	36.4	19 12 57.04	.42	. .	.63	19 12 47.83	10.13	
	24	δ Aquilæ	18.8	31.7	44.1	56.5	9.1	21.7	34.1	19 17 56.57	.36	. .	.63	19 17 47.30	8.65	
	25	Moon, 1st L.	1.3	15.1	28.8	42.2	55.8	9.1	22.6	19 22 42.13	.42	+ 71.38	.64	19 23 44.29	. .	
	26	ϵ^2 Sagittarii	15.9	29.1	42.1	55.6	8.4	21.2	34.4	19 33 55.24	.42	. .	.64	19 33 46.02	9.91	
	27	γ Aquilæ	30.8	43.7	56.2	9.2	21.9	34.1	47.1	19 39 9.00	.34	. .	.64	19 38 59.70	7.98	
	28	α Aquilæ	50.9	3.6	16.3	29.2	41.4	54.0	7.0	19 43 28.91	.35	. .	.65	19 43 19.61	8.20	
	29	β Aquilæ	19.9	32.6	45.2	57.8	10.1	22.8	35.4	19 47 57.69	.35	. .	.65	19 47 48.39	8.27	
	30	α^2 Capricorni	4.8	17.7	30.7	43.8	56.3	9.0	21.9	20 9 43.46	+ 0 0.41	. .	.67	20 9 34.20	+ 9.49	
	31	λ Ursæ Minoris	..	..	..	21.0	40.0	3.5	40.0	20 32 56.12	−15 49.16	. .	.68	20 16 57.28	−232.87	
	32	61^1 Cygni	25.7	41.8	57.7	13.6	29.5	45.0	1.0	21 0 13.47	+ 0 0.24	. .	.70	21 0 4.01	+ 6.76	
	33	ζ Cygni	53.0	7.6	22.1	36.5	50.8	5.0	19.1	21 6 36.30	.27	. .	.70	21 6 26.87	6.44	
	34	σ Cygni	47.4	3.4	19.8	35.8	51.5	7.2	23.7	21 11 35.54	.24	. .	.71	21 11 26.07	5.56	
	35	Saturn, 1st L.	50.7	3.9	17.0	29.9	42.6	55.2	8.4	21 57 29.67	.40	+ 0.63	.74	21 57 20.96	. .	
	36	Venus, 2d L.	31.0	44.3	57.7	10.8	23.8	36.7	50.0	9 5 10.61	.32	− 0.39	10.16	9 5 0.38	. .	
2	37	Sun, 1st L.	52.0	4.8	17.4	30.1	42.8	..	..	10 44 17.42	12.93	. .	.32	10 45 24.36	. .	
	38	Sun, 2d L.	0.7	13.3	26.0	38.8	51.4	..	16.7	10 46 34.48	4.54					
	39	57 Sagittarii, (6803)	48.7	2.1	15.4	28.7	42.0	55.1	8.5	19 43 28.64	0.43	. .	.58	19 43 18.49	10.06	
	40	ϑ Aquilæ	57.4	10.2	22.9	35.3	47.8	0.1	12.7	20 3 35.20	.38	. .	.59	20 3 24.99	8.74	
	41	α^2 Capricorni	5.3	18.5	31.6	44.4	57.0	9.8	22.9	20 9 44.21	.41	. .	.60	20 9 34.02	9.49	
	42	β^2 Capricorni	56.1	9.2	22.3	35.4	48.0	1.1	14.0	20 12 35.16	.42	. .	.60	20 12 24.98	9.62	
	43	Moon, 1st L.	43.2	56.9	10.0	23.4	36.5	49.8	3.2	20 25 23.29	.41	+ 71.14	.60	20 26 24.24	. .	
	44	α Cygni	32.0	49.8	7.5	25.1	42.5	59.9	17.8	20 36 24.94	.21	. .	.61	20 36 14.54	4.55	
	45	ε Aquarii	55.9	8.8	21.6	34.3	46.9	59.4	12.1	20 39 34.14	.40	. .	.61	20 39 23.93	9.16	
	46	μ Aquarii	56.2	9.3	22.0	34.8	47.1	0.2	12.7	20 44 34.61	.40	. .	.61	20 44 24.40	9.10	
	47	61^1 Cygni	26.4	42.6	58.7	14.3	30.1	45.9	1.9	21 0 14.27	.25	. .	.62	21 0 3.90	6.76	
	48	ζ Cygni	53.8	8.1	22.9	37.1	51.3	5.9	20.1	21 6 37.03	.27	. .	.62	21 6 26.68	6.44	
	49	σ Cygni	48.1	4.2	20.6	36.6	52.2	8.2	24.4	21 11 36.33	+ 0 0.24	. .	.62	21 11 25.95	5.56	
	50	α Cephei	..	15.8	42.6	9.2	35.6	2.0	28.9	21 15 22.35	− 0 13.29	. .	.63	21 14 58.43	1.28	
	51	δ Capricorni	6.9	20.0	33.1	46.2	59.2	12.0	25.1	21 38 46.07	+ 0 0.42	. .	.64	21 38 35.85	+ 9.51	
	52	Saturn, 1st L.	34.7	47.9	1.0	13.8	26.5	39.2	52.4	21 57 13.64	+ 0 0.40	+ 0.63	− 10.65	21 57 4.02	. .	

8. The night warm, and weather hazy.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 18*h*.	0*s*.
	s.	s.	s.	s.	
Aug. 31	+0.372	−0.163	0.000	*f* 9.00	*g* .038
Sept. 1	.372	.163	.000	9.59	.038
" 2	+0.372	−0.163	0.000	10.53	*g* .029

APPARENT RIGHT ASCENSIONS OBSERVED WITH THE WEST TRANSIT INSTRUMENT.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
Sept. 2	1	Venus, 2d L.	27.5	41.0	54.1	7.4	20.2	33.3	46.6	9 10 7.13	+ 0 0.40	− 0.39	− 10.97	9 9 56.17	. .	A.
3	2	Sun, 1st L.	29.9	42.7	55.5	8.1	20.8	33.1	45.7	10 48 7.97	.45	. .	.99	10 49 1.77	. .	
	3	Sun, 2d L.	38.5	51.4	4.0	16.9	29.3	41.9	54.6	10 50 16.66	.45					
	4	Polaris, S. P.	14.0	15.5	9.0	57.5	53.0	53.5	57.0	13 5 2.79	+ 0 12.68	. .	11.09	13 5 4.38	− 2.16	
	5	η Ursæ Majoris	..	0.1	19.8	39.4	58.7	17.8	37.6	13 41 48.90	− 0 9.67	. .	.11	13 41 28.12	+ 9.42	
	6	η Bootis	53.3	6.9	20.2	33.2	46.4	59.4	12.9	13 57 33.19	+ 0 0.38	. .	.12	13 47 22.45	10.03	
	7	ι Ursæ Majoris	..	..	32.7	51.5	10.4	29.1	48.3	8 49 10.40	− 0 18.85	. .	.89	8 48 39.66	+ 14.94	
	8	Venus, 2d L.	23.5	36.9	50.1	3.2	16.2	29.1	42.3	9 15 3.04	+ 0 0.40	− 0.39	.91	9 14 51.14	. .	
4	9	Sun, 1st L.	7.6	20.7	33.2	45.9	58.4	10.9	23.7	10 51 45.77	.45	. .	12.01	10 52 38.45	. .	
	10	Sun, 2d L.	16.2	29.0	41.8	54.4	6.9	19.3	32.2	10 53 54.26	.45					
	11	Polaris, S. P.	18.0	17.5	9.5	0.0	52.5	51.0	56.5	13 5 3.57	12.68	. .	.08	13 5 4.17	− 2.51	
	12	η Ursæ Majoris	41.2	1.1	20.7	40.2	59.4	18.8	38.4	13 41 39.97	+ 0 0.12	. .	.10	13 41 27.99	+ 9.43	
	13	ι Ursæ Majoris	..	14.4	33.4	52.3	11.2	29.9	49.0	8 49 1.70	− 0 9.37	. .	.71	8 48 39.62	14.92	
	14	Venus, 2d L.	18.6	31.9	45.0	58.2	11.0	24.0	37.3	9 19 58.00	+ 0 0.40	− 0.38	.73	9 19 45.29	. .	
	15	Mercury	36.7	49.7	2.6	..	..	..	..	9 54 49.67	25.96	. .	.74	9 55 2.89	. .	
5	16	Sun, 1st L.	45.4	58.3	10.9	23.6	36.1	48.4	1.2	10 55 23.41	0.46	. .	.56	10 56 15.54	. .	
	17	Sun, 2d L.	53.9	6.8	19.2	32.1	44.4	57.0	..	10 57 25.57	6.76					
	18	γ Ursæ Majoris	49.6	..	..	..	..	..	59.5	11 45 54.55	0.18	. .	.62	11 45 42.11	+ 12.83	
	19	Polaris, S. P.	17.0	18.5	9.0	56.5	55.0	53.5	56.5	13 5 3.71	12.68	. .	.72	13 5 3.67	− 2.90	
	20	η Ursæ Majoris	42.0	2.0	21.5	41.0	0.4	19.6	39.1	13 41 40.80	0.12	. .	.76	13 41 28.16	+ 9.45	
	21	η Bootis	55.0	8.4	21.8	35.0	48.3	1.1	14.7	13 47 34.90	+ 0 0.38	. .	.77	13 47 22.51	10.05	
6	22	α Hydræ	..	51.1	3.9	16.4	29.0	41.4	54.3	9 20 22.68	− 0 5.79	. .	14.34	9 20 2.55	+ 10.35	
	23	Venus, 2d L.	6.1	19.4	32.6	45.4	58.3	11.3	24.6	9 29 45.39	+ 0 0.40	− 0.38	.35	9 29 31.06	. .	
	24	Mercury	..	9.7	22.8	35.4	48.2	0.7	13.6	9 58 41.73	− 0 5.98	. .	.35	9 58 21.40	. .	
7	25	Sun, 1st L.	0.1	12.8	25.5	38.2	50.6	3.0	15.8	11 2 38.00	+ 0 0.46	. .	.38	11 3 28.26	. .	
	26	Sun, 2d L.	8.4	21.1	33.9	46.5	58.9	11.4	24.3	11 4 46.36	+ 0 0.46					
	27	δ Ursæ Minoris	34.0	8.5	43.0	13.5	41.5	11.5	43.0	18 22 10.71	− 0 4.87	. .	.58	18 21 51.26	− 69.07	
	28	ζ¹ Lyræ	57.5	13.4	29.1	45.2	0.9	16.4	..	18 39 37.08	+ 0 8.13	. .	.58	18 39 30.63	+ 5.69	
	29	β Lyræ	55.5	10.7	25.8	40.8	55.8	10.2	25.1	18 44 40.56	0.28	. .	.58	18 44 26.26	6.17	
	30	π Sagittarii	13.5	27.1	40.8	54.0	7.1	20.6	34.1	19 0 53.89	.62	. .	.59	19 0 39.92	10.54	
	31	η Lyræ	59.8	15.7	32.1	48.4	4.2	19.9	36.0	19 8 48.01	.24	. .	.60	19 8 33.65	5.38	
	32	ρ¹ Sagittarii	22.4	35.9	49.0	2.1	15.2	28.2	41.4	19 13 2.03	.60	. .	.60	19 12 48.03	10.21	
	33	δ Aquilæ	23.9	36.4	49.0	1.6	14.0	26.1	39.0	19 18 1.43	.48	. .	.60	19 17 47.31	8.72	
	34	β¹ Cygni	5.2	19.7	34.0	48.1	2.1	16.0	30.1	19 24 47.89	.33	. .	.60	19 24 33.62	6.61	
	35	γ Aquilæ	35.4	48.3	1.2	13.9	26.4	31.9	51.8	19 39 13.73	.44	. .	.61	19 38 59.56	8.06	
	36	α Aquilæ	55.6	8.3	21.1	33.9	46.2	58.9	11.5	19 43 33.64	.45	. .	.61	19 43 19.48	8.27	
	37	β Aquilæ	24.6	37.4	50.0	2.7	15.1	27.5	40.0	19 48 2.47	.46	. .	.61	19 47 48.32	8.34	
	38	ϑ Aquilæ	1.4	13.9	26.8	39.1	51.5	4.0	16.7	20 3 39.06	.51	. .	.62	20 3 24.95	8.79	
	39	α² Capricorni	9.6	22.5	35.7	48.2	1.0	13.7	26.8	20 9 48.21	+ 0 0.57	. .	.63	20 9 34.15	+ 9.54	
	40	λ Ursæ Minoris	..	..	..	20.0	44.0	4.0	43.5	20 32 57.87	−15 56.48	. .	.63	20 16 46.76	−227.90	
	41	61¹ Cygni	30.2	46.2	2.3	18.3	34.1	49.7	5.7	21 0 18.07	+ 0 0.25	. .	.65	21 0 3.67	+ 6.81	
	42	ζ Cygni	57.6	12.0	26.8	41.0	55.2	9.6	24.0	21 6 40.89	.31	. .	.65	21 6 26.55	6.48	
	43	Sun, 1st L.	36.9	49.7	2.4	15.0	27.6	39.8	52.5	11 6 14.84	.46	. .	15.01	11 7 4.38	. .	
8	44	Sun, 2d L.	45.2	58.0	10.4	23.0	35.7	48.1	0.8	11 8 23.03	.46					
	†45	Venus	49.8	3.1	16.2	28.9	41.8	54.7	7.5	9 39 28.86	+ 0 0.41	. .	.62	9 39 13.65	. .	
9	46	Sun, 1st L.	..	26.3	39.0	51.5	3.9	16.3	29.1	11 9 57.68	− 0 5.85	. .	.38	11 10 40.58	. .	
	47	Sun, 2d L.	21.8	34.4	47.0	0.0	12.3	24.8	37.2	11 11 59.64	+ 0 0.46					
	48	ϑ Aquilæ	3.0	15.5	28.0	40.6	52.8	5.3	17.4	20 3 40.37	.50	. .	.85	20 3 25.02	8.81	
	49	α² Capricorni	10.8	23.6	36.9	49.8	1.1	15.0	27.8	20 9 49.29	.57	. .	.85	20 9 34.01	9.56	
	50	β² Capricorni	1.3	14.4	27.5	40.7	53.0	6.1	19.1	20 12 40.30	.58	. .	.85	20 12 25.03	9.67	
	51	α Piscium	22.1	35.0	47.8	0.2	12.8	25.4	37.9	0 13 0.17	.45	. .	16.06	0 12 44.56	8.37	
	52	α Cassiopeiæ	2.9	25.3	47.8	9.8	32.0	53.8	16.2	0 32 9.69	+ 0 0.03	. .	− 16.07	0 31 53.65	+ 7.69	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 18h.	H. Rate. 0s.
	s.	s.	s.	s.	
Sept. 3	+0.497	−0.319	0.000	11.28	g .041
" 7	.497	.319	.000	14.57	.027
" 9	+0.497	+0.319	.000	15.75	g .052

45. Observed the centre of Venus.

TE. 46.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	h. m. s.	m. s.	s.	s.	h. m. s.	s.	
9	1	β Ceti	30.5	44.2	57.7	10.8	24.0	36.9	50.1	0 36 10.60	+ 0 0.66	. .	— 16.08	0 35 55.18	+ 8.38	A.
11	2	Venus, 2d L.	20.0	33.2	46.3	59.2	12.2	24.6	37.8	9 53 59.04	+ 0 0.41	— 0.37	17.84	9 53 41.24	. .	
	3	α Leonis	..	3.2	16.2	28.9	41.7	54.5	7.0	10 0 35.25	— 0 6.02	. .	.84	10 0 11.39	11.30	
	4	Mercury	20.8	34.0	46.9	59.6	12.2	24.8	37.9	10 15 59.46	+ 0 0.42	. .	.84	10 15 42.04	. .	
12	5	Sun, 1st L.	2.8	15.7	28.1	40.7	53.0	5.4	18.1	11 20 40.54	.47	. .	.67	11 21 27.49	. .	
	6	Sun, 2d L.	11.0	24.0	36.4	49.0	1.3	13.8	26.4	11 22 48.84	.47					
	7	γ Ursæ Majoris	54.8	16.5	38.3	0.1	21.3	42.7	4.5	11 45 59.74	.04	. .	.70	11 45 42.08	+ 12.83	
	8	Polaris, S. P.	27.5	30.0	19.0	11.0	3.0	1.0	6.0	13 5 13.93	12.68	. .	.76	13 5 8.85	— 7.30	
	9	η Ursæ Majoris	46.9	6.6	26.4	45.8	5.0	..	..	13 41 26.14	+ 0 19.58	. .	.80	13 41 27.92	+ 9.56	
13	10	α Leonis	..	..	..	..	..	55.8	8.7	10 1 2.25	— 0 31.59	. .	19.22	10 0 11.44	+ 11.28	K.
	11	Venus, 2d L.	56.1	9.1	22.3	35.0	57.9	0.5	13.5	1 3 34.90	+ 0 0.41	— 0.37	.42	1 3 15.52	. .	
14	12	δ Ursæ Minoris	..	..	..	..	..	..	49.0	18 32 49.00	—10 38.47	. .	.66	18 21 50.87	— 66.15	
	13	β Lyræ	..	..	..	..	0.4	15.2	30.7	18 45 15.43	0 29.58	. .	.67	18 44 26.18	+ 6.32	
	14	ζ Aquilæ	..	..	..	..	..	7.8	20.6	18 59 14.20	— 0 31.72	. .	.67	18 58 22.81	8.04	
	15	δ Aquilæ	28.7	41.6	54.0	6.5	19.0	31.2	44.0	19 18 6.43	+ 0 0.48	. .	.68	19 17 47.23	+ 8.83	
	16	λ Ursæ Minoris	..	..	57.0	26.0	..	4.0	..	20 20 49.00	— 3 47.47	. .	.70	20 16 41.83	—221.55	
15	17	α Lyræ	17.0	33.2	49.3	5.3	21.4	37.2	53.4	18 32 5.26	+ 0 0.25	. .	.68	18 31 45.83	+ 5.84	A.
	18	ζ^1 Lyræ	2.7	18.5	34.6	50.1	5.6	21.3	37.2	18 39 50.00	.25	. .	.69	18 39 30.56	5.87	
	19	β Lyræ	0.7	15.8	30.9	45.7	0.7	15.1	30.6	18 44 45.64	.28	. .	.69	18 44 26.22	6.34	
	20	ξ^2 Sagittarii	14.8	28.5	42.0	55.3	8.8	21.9	35.4	18 48 55.24	.62	. .	.70	18 48 36.16	10.81	
	21	ζ Aquilæ	3.4	16.3	29.4	42.3	55.1	7.7	20.7	18 58 42.13	.41	. .	.70	18 58 22.84	8.05	
	22	π Sagittarii	18.5	32.3	45.4	59.1	12.6	25.8	39.1	19 1 58.97	.62	. .	.70	19 0 39.89	10.65	
	†23	η Aquarii	12.0	25.0	37.2	50.0	2.2	14.5	27.2	22 27 49.73	.50	. .	.83	22 27 30.40	8.41	
	24	ζ Pegasi	31.9	45.0	57.8	10.5	22.9	35.4	48.2	22 34 10.24	.44	. .	.84	22 33 50.84	7.97	
	25	α Piscis Aust.	47.3	2.1	16.7	31.0	45.5	0.0	14.2	22 49 30.97	.68	. .	.84	22 49 11.81	9.24	
	26	α Pegasi	50.1	3.0	16.2	29.0	41.8	54.8	7.5	22 57 28.91	+ 0 0.41	. .	.85	22 57 9.47	7.89	
16	27	Sun, 1st L.	..	..	..	..	18.3	30.8	43.6	11 35 30.90	— 0 24.64	. .	20.81	11 35 49.39	. .	K.
	28	Sun, 2d L.	35.8	48.8	1.4	13.8	26.4	38.6	51.5	11 37 13.76	+ 0 0.38					
	29	β Lyræ	1.8	16.9	32.0	47.0	1.8	16.6	31.4	18 44 46.79	.27	. .	.98	18 44 26.08	6.37	
	30	ζ Aquilæ	4.7	17.8	30.8	43.7	56.4	9.1	22.1	18 58 43.51	.35	. .	.99	18 58 22.87	8.07	
	31	δ Aquilæ	30.0	42.9	55.4	8.1	20.4	32.8	45.2	19 18 7.83	.39	. .	.99	19 17 47.25	8.86	
	32	γ Aquilæ	41.7	54.8	7.4	20.1	32.8	45.4	58.2	19 39 20.06	.36	. .	21.00	19 38 59.42	8.19	
	33	α Cassiopeiæ	7.8	30.3	53.0	15.4	37.2	59.0	21.5	0 32 14.89	.16	. .	.12	0 31 53.95	7.57	
	34	β Ceti	36.3	49.6	2.8	16.0	29.2	42.3	55.5	0 36 15.96	.46	. .	.12	0 35 55.30	+ 8.29	
	35	Herschel	34.8	47.6	0.4	12.7	25.2	37.6	50.3	0 49 12.66	+ 0 0.38	. .	.13	0 48 51.91	. .	
	†36	Polaris	..	..	..	43.0	..	..	..	1 5 43.00	— 0 13.47	. .	.13	1 5 8.40	— 7.88	
	37	α Leonis	53.1	6.3	19.3	32.1	44.9	57.4	10.2	10 0 31.90	+ 0 0.35	. .	20.99	10 0 11.26	+ 11.23	A.
	†38	Venus	13.7	26.5	39.7	52.3	5.0	17.8	30.7	10 17 52.24	.35	. .	.99	10 17 31.60	. .	
	†39	Mercury	30.7	43.8	56.6	9.3	22.0	34.7	47.4	10 43 9.21	.36	. .	21.00	10 42 48.57	. .	
17	40	Sun, 1st L.	3.7	16.5	29.1	41.8	54.1	6.5	19.0	11 38 41.53	.39	. .	.14	11 39 24.72	. .	
	41	Sun, 2d L.	11.7	24.2	37.0	49.4	2.0	14.4	27.2	11 40 49.41	.39					
	42	α Leonis	54.0	7.0	20.1	33.0	45.7	58.1	11.3	10 0 32.74	.35	. .	.60	10 0 11.49	11.22	
	†43	Venus	58.2	11.3	24.1	37.0	49.6	2.2	15.3	10 22 36.81	.35	. .	.61	10 22 15.55	. .	
	†44	Mercury	41.0	54.1	6.8	19.7	32.2	44.8	57.6	10 49 19.46	.36	. .	.62	10 48 58.20	. .	
18	45	α Leonis	54.6	7.7	20.3	33.5	46.1	58.8	11.8	10 0 33.26	.35	. .	.60	10 0 12.01	11.20	
	†46	Venus	41.9	55.0	7.8	20.6	33.3	46.0	58.8	10 27 20.49	.36	. .	.61	10 26 59.24	. .	
19	47	Sun, 1st L.	16.0	28.7	41.2	53.9	6.1	18.8	31.2	11 45 53.70	.39	. .	22.03	11 46 36.06	. .	
	48	Sun, 2d L.	24.0	36.8	49.1	2.0	14.4	26.4	39.3	11 48 1.71	.39					
	49	η Ursæ Majoris	50.9	10.7	30.2	49.8	9.4	28.6	48.2	13 41 49.69	.17	. .	.07	13 41 27.79	9.68	
	50	η Bootis	4.2	17.6	31.0	44.3	57.4	10.7	23.9	13 47 44.16	.32	. .	.07	13 47 22.41	10.19	
	51	ζ^1 Lyræ	4.8	20.9	36.4	52.3	8.0	23.1	39.2	18 39 52.10	.25	. .	.17	18 39 30.18	5.98	
	52	β Lyræ	2.9	17.9	33.2	48.0	3.0	17.7	32.9	18 44 47.94	+ 0 0.26	. .	— 22.17	18 44 26.03	+ 6.44	

23. Stars unsteady, commencing at η Aquarii.
36. While observing Polaris, accidentally knocked the instrument.
38, 39. Observed the centre of Venus and Mercury.
43, 44, 46. Observed the centre of Venus and Mercury.

DATE.	VALUE OF m.	n.	c.	CLOCK. At 9h.	H. Rate. 0s.
	s.	s.	s.	s.	
Sept. 14	+0.497	—0.319	0.000	f 19.65	g .017
" 15	.497	.319	.000	19.67	.037
" 16	.394	.190	.000	20.97	.024
" 19	+0.394	—0.190	0.000	22.16	g .021

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
Sept. 19	1	ξ^2 Sagittarii	17.3	30.9	44.4	57.9	11.2	24.1	38.0	13 48 57.69	+ 0 0.47	. .	— 22.17	18 48 35.99	+ 10.81	A
	2	ζ Aquilæ	5.9	18.7	31.9	44.7	57.5	10.0	23.2	18 58 44.56	.35	. .	.18	18 58 22.73	+ 8.13	
20	3	Venus, 2d L.	7.8	20.5	33.5	46.3	58.8	11.4	24.4	10 36 46.10	.36	— 0.37	.72	10 36 23.37	. .	K
	4	Mercury, 2d L.	59.8	12.8	22.6	38.2	..	3.1	16.2	11 8 35.93	+ 0 2.46	— 0.18	.73	11 8 15.48	. .	
21	5	λ Ursæ Minoris	..	..	37.0	3.0	25.0	..	..	20 17 1.67	— 0 3.47	. .	23.51	20 16 34.79	—214.49	
	6	α Cygni	44.3	2.2	19.8	37.8	55.0	12.7	30.4	20 36 37.46	+ 0 0.23	. .	.51	20 36 14.18	+ 4.89	
	7	γ Pegasi	7.3	20.3	33.4	46.4	59.3	12.0	24.8	0 5 46.21	.23	. .	.58	0 5 22.86	8.16	
	8	α Cassiopeiæ	10.4	33.0	55.3	17.8	39.5	1.8	24.0	0 32 17.40	+ 0 0.23	. .	.59	0 31 53.04	7.50	
	9	β Ceti	..	..	5.4	18.5	31.7	44.8	58.0	0 36 31.68	— 0 13.04	. .	.59	0 35 55.05	+ 8.24	
	10	Herschel	55.0	7.8	20.5	33.0	45.7	58.3	10.5	0 48 32.97	+ 0 0.22	. .	.59	0 48 9.60	. .	
	11	Polaris	40.0	..	42.0	..	..	..	..	1 49 41.00	+15 53.26	. .	.61	1 5 10.65	— 8.85	
	12	α Leonis	..	8.8	21.7	34.6	47.3	0.2	13.0	10 0 40.93	— 0 6.21	. .	.24	10 0 11.48	+ 11.16	A
	13	α Ursæ Majoris	..	..	..	33.5	0.6	27.4	54.9	10 55 14.10	— 0 40.55	. .	.25	10 54 10.30	15.27	
	14	Mercury	35.4	48.2	1.1	13.7	26.2	38.9	51.6	11 15 13.59	+ 0 0.21	. .	.26	11 14 50.54	. .	
22	15	Sun, 1st L.	3.9	16.7	29.4	41.9	54.2	6.8	19.1	11 56 41.71	.21	. .	.27	11 57 22.72	. .	
	16	Sun, 2d L.	12.1	24.9	37.4	50.0	2.4	14.8	27.4	11 58 49.86	.21					
	17	α Virginis	51.8	5.0	17.8	30.4	43.0	55.4	8.3	13 17 30.24	.22	. .	.30	13 17 7.16	10.88	
	18	ζ Aquilæ	7.3	20.2	33.1	46.0	58.5	11.4	24.4	18 58 45.84	.22	. .	.39	18 58 22.66	8.18	
	19	π Sagittarii	22.2	35.7	49.4	2.9	16.1	29.3	42.9	19 1 2.64	+ 0 0.22	. .	.39	19 0 39.47	+ 10.79	
	20	δ Draconis	16.5	49.3	22.6	54.7	27.4	59.1	32.5	19 12 54.59	— 0 0.26	. .	.39	19 12 31.58	— 1.28	
	21	δ Aquilæ	32.5	45.1	57.9	10.3	22.9	35.1	47.9	19 18 10.24	+ 0 0.21	. .	.39	19 17 47.06	+ 8.96	
	22	α Leonis	56.7	9.7	22.6	35.6	48.3	1.1	14.0	10 0 35.43	.22	. .	24.08	10 0 11.57	11.14	K
23	23	δ Aquilæ	33.5	46.3	58.9	11.6	24.0	36.3	48.9	19 18 11.36	+ 0 0.22	. .	.46	19 17 47.12	8.98	
	24	γ Aquilæ	45.1	..	..	23.6	36.3	48.9	1.7	19 39 31.12	— 0 7.38	. .	.47	19 38 59.27	8.30	
	25	β Aquilæ	34.4	47.3	49.8	12.4	24.9	37.5	50.0	19 48 12.33	+ 0 0.22	. .	.47	19 47 48.07	8.57	
	26	α^2 Capricorni	19.5	32.4	45.1	58.2	10.9	23.7	36.7	20 9 58.07	+ 0 0.22	. .	.47	20 9 33.73	+ 9.74	
	27	λ Ursæ Minoris	..	..	38.0	..	30.0	..	32.0	20 27 33.33	—10 30.24	. .	.47	20 16 38.62	—212.64	
	28	α Cygni	..	..	21.1	38.6	56.1	13.4	31.3	20 36 56.10	17.46	. .	.48	20 36 14.20	+ 4.93	
	29	Polaris	..	..	..	..	..	..	24.0	1 29 24.00	—23 47.25	. .	.52	1 5 12.33	— 9.94	
	30	α Arietis	18.0	31.9	45.1	58.9	12.6	25.8	..	1 58 52.05	+ 0 7.01	. .	.53	1 58 34.53	9.07	
	31	Mercury	54.5	7.2	20.0	32.9	45.3	57.4	10.5	11 28 32.54	0.21	. .	.26	11 28 8.49	. .	A
24	†32	Polaris, S. P.	49.0	51.0	41.5	28.5	26.0	27.5	29.0	13 5 26.07	+ 0 7.65	. .	.48	13 5 19.24	— 10.12	
	33	α Virginis	..	5.4	18.3	31.1	43.4	56.0	9.0	13 17 37.20	— 0 5.95	. .	.48	13 17 6.77	+ 10.88	
	34	α Bootis	23.5	37.0	50.5	3.7	16.9	30.2	43.4	14 9 3.60	+ 0 0.32	. .	.47	14 8 39.45	9.76	
	†35	Moon, 1st L.	24.0	38.0	51.5	4.9	18.2	31.3	45.0	15 7 4.70	.45	+ 66.91	.47	15 7 47.59	. .	
	36	β^1 Cygni	15.0	29.1	43.5	57.8	11.8	25.7	39.9	19 24 57.54	.29	. .	.45	19 24 33.38	6.93	
	37	e^2 Sagittarii	30.5	43.9	57.0	10.0	23.0	35.9	48.9	19 34 9.89	.45	. .	.45	19 33 45.89	10.24	
	38	γ Aquilæ	45.1	58.0	10.9	23.6	36.2	48.7	1.6	19 39 23.44	.36	. .	.45	19 38 59.35	8.33	
	39	α Aquilæ	5.3	18.0	30.9	43.5	56.0	8.4	21.2	19 43 43.33	.37	. .	.45	19 43 19.25	8.52	
	40	Mercury, 2d L.	35.2	48.1	1.0	13.5	26.2	38.3	51.1	11 35 13.34	.38	— 0.17	.75	11 34 48.80	. .	
25	41	α Aquilæ	5.7	18.3	31.0	43.8	56.2	8.9	21.4	19 43 43.61	.38	. .	.67	19 43 19.32	8.55	
	42	β Aquilæ	34.7	47.3	0.1	12.6	25.2	37.4	50.1	19 48 12.49	+ 0 0.37	. .	.68	19 47 48.18	8.60	
	43	61^1 Cygni	..	..	..	..	44.0	59.7	15.5	21 0 59.73	— 0 31.48	. .	.70	21 0 3.55	7.05	
	44	α Andromedæ	12.1	26.8	41.0	55.1	9.3	23.4	37.6	0 0 55.05	+ 0 0.29	. .	.75	0 0 30.59	7.87	
	45	γ Pegasi	8.3	21.4	34.5	47.2	0.3	12.9	26.0	0 5 47.23	.35	. .	.75	0 5 22.83	8.14	
	46	Comet Star, —1° 21′	29.1	41.8	54.6	7.0	19.4	31.9	44.4	0 28 6.89	.40	. .	.76	0 27 42.53	8.27	
	47	Comet Star, —1 21	2.9	15.6	28.2	40.7	53.1	5.4	18.0	0 30 40.56	+ 0 0.40	. .	.76	0 30 16.20	+ 8.26	
	48	Polaris	46.0	..	..	47.0	39.0	29.0	29.5	1 10 26.10	— 4 49.30	. .	.77	1 5 12.03	— 10.65	
	49	ϑ Ceti	9.5	22.4	35.1	47.8	0.4	13.0	25.6	1 16 47.69	+ 0 0.42	. .	.77	1 16 23.34	+ 8.26	
27	50	Venus	45.4	58.1	11.0	23.7	36.1	48.7	1.4	11 9 23.49	.37	. .	.89	11 8 58.97	. .	
28	51	Sun, 1st L.	42.4	55.0	7.6	20.4	32.8	44.9	57.9	12 18 20.14	.40	. .	— 25.42	12 18 59.37	. .	
	52	Sun, 2d L.	50.9	3.8	16.3	28.9	41.1	53.4	6.1	12 20 28.64	+ 0 0.40					

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 18h.	0s.
	s.	s.	s.	s.	
Sept. 19	+0.394	—0.190	0.000	f 22.15	g .021
" 21	.215	+0.014	.000	23.49	.019
" 22	.215	.014	.000	23.39	.023
" 23	.215	+0.014	.000	24.45	.010
" 24	.394	—0.190	.000	24.45	l .004
" 25	+0.394	—0.190	0.000	24.67	.017

32. Polaris steady; observation excellent.
35. Atmosphere hazy; Moon's limb indistinct.
Sept. 23. Found eye-tube had been moved by accident of Sept. 16; adjusted it.

ATE. 846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
28	1	Saturn, 1st L.	37.7	51.0	4.0	16.6	29.6	42.0	55.4	21 51 16.61	+ 0 0.44	+ 0.62	— 25.61	21 50 52.06	. .	A.
	2	α Aquarii	43.9	56.4	9.0	21.6	33.9	46.1	59.0	21 58 21.41	.40	. .	.61	21 57 56.20	+ 8.56	
	3	η Aquarii	18.0	30.5	43.3	56.0	8.2	20.5	33.1	22 27 55.66	.39	. .	.62	22 27 30.43	8.46	
	4	ζ Pegasi	38.0	50.8	3.7	16.4	28.9	41.2	54.1	22 34 16.16	.36	. .	.62	22 33 50.90	8.04	
	5	λ Aquarii	25.8	38.2	51.1	4.0	16.4	28.8	41.4	22 45 3.67	.42	. .	.63	22 44 38.46	8.62	
	6	α Pegasi	55.9	9.2	22.1	35.0	48.0	0.3	13.6	22 57 34.87	.35	. .	.63	22 57 9.59	7.91	
	7	φ Aquarii	12.0	24.6	37.4	49.9	2.5	14.9	27.7	23 6 49.86	.42	. .	.63	23 6 24.65	8.51	
	8	ψ³ Aquarii	47.5	0.6	13.7	26.2	38.9	51.4	4.2	23 11 26.07	.43	. .	.63	23 11 0.87	8.56	
	9	Venus, 2d L.	23.7	36.6	49.4	2.3	14.6	27.2	40.0	11 14 1.97	.37	— 0.35	26.23	11 13 35.76	. .	K.
29	10	Sun, 1st L.	20.2	32.9	45.5	58.4	10.8	23.2	35.7	12 21 58.10	.17	. .	.13	12 22 36.34	. .	
	11	Sun, 2d L.	28.6	41.3	54.0	6.6	19.3	31.3	44.4	12 24 6.50	.17					
	12	ρ¹ Sagittarii	34.1	47.7	0.8	14.0	27.1	39.9	53.3	19 13 13.84	.21	. .	.26	19 12 47.79	+ 10.58	
	13	Moon, 1st L.	15.1	28.9	42.4	55.8	8.9	21.9	35.7	19 58 55.53	+ 0 0.21	+ 69.97	.28	19 59 39.43	. .	
	14	λ Ursæ Minoris	22.0	..	..	..	25.0	36.0	26.0	20 24 42.25	— 7 57.04	. .	.29	20 16 18.92	—206.02	
	15	γ Pegasi	..	..	36.5	49.3	2.2	14.8	27.9	0 6 2.14	0 12.79	. .	.36	0 5 22.99	+ 8.13	
	16	Polaris	51.0	57.0	55.0	52.0	42.0	27.0	36.0	1 5 45.71	— 0 7.00	. .	.38	1 5 12.33	— 11.61	
	17	ϑ Ceti	11.4	24.6	37.3	49.8	2.6	14.8	27.9	1 16 49.63	+ 0 0.19	. .	.39	1 16 23.43	+ 8.11	
	18	α Ursæ Majoris	15.0	42.6	9.9	37.0	4.1	30.3	58.3	10 54 36.74	— 0 0.13	. .	.22	10 54 10.39	15.12	A.
	19	Venus	0.6	13.3	26.1	38.9	51.2	3.7	16.4	11 18 38.60	+ 0 0.17	. .	.23	11 18 12.54	. .	
	20	γ Ursæ Majoris	3.8	25.6	47.3	9.0	30.2	51.2	13.3	11 46 8.63	— 0 0.03	. .	.24	11 45 42.36	+ 12.73	
30	21	Sun, 1st L.	..	9.7	22.6	35.1	47.6	59.9	12.5	12 25 41.23	— 0 6.10	. .	.45	12 26 13.01	. .	
	22	Sun, 2d L.	5.8	18.5	31.1	43.8	56.3	8.4	21.3	12 27 43.60	+ 0 0.19					
	23	Polaris, S. P.	45.0	55.0	38.0	26.0	19.5	24.0	27.0	13 5 33.50	+ 0 7.52	. .	.46	13 5 14.56	— 11.66	
	24	α Virginis	..	7.7	20.5	33.2	45.8	58.1	11.0	13 17 39.39	— 0 6.19	. .	.47	13 17 6.73	+ 10.89	
	25	η Ursæ Majoris	55.2	15.2	34.9	54.2	13.9	32.6	52.8	13 41 54.11	0 0.00	. .	.47	13 41 27.64	9.70	
	26	η Bootis	8.8	22.0	35.3	48.8	2.0	14.9	28.3	13 47 48.59	+ 0 0.13	. .	.48	13 47 22.24	10.25	
	27	α Bootis	25.8	39.1	52.3	6.0	18.8	32.1	45.6	14 9 5.67	+ 0 0.13	. .	.48	14 8 39.32	9.81	
	28	β¹ Cygni	..	31.4	45.8	59.9	14.0	27.6	42.2	19 25 6.82	— 0 6.98	. .	.59	19 24 33.25	7.07	
	29	ε² Sagittarii	33.1	46.2	59.3	12.2	25.3	38.1	51.3	19 34 12.21	+ 0 0.21	. .	.59	19 33 45.83	10.35	
	30	γ Aquilæ	47.6	0.3	13.1	26.1	38.4	50.8	3.9	19 39 25.74	.16	. .	.59	19 38 59.31	8.43	
	31	Sagittarii, (6803)	4.8	18.0	31.5	44.9	58.0	11.0	24.3	19 43 44.64	.21	. .	.59	19 43 18.26	10.48	
	32	β Aquilæ	36.8	49.3	2.0	14.5	27.0	39.3	52.1	19 48 14.43	.17	. .	.60	19 47 48.00	8.69	
	33	α² Capricorni	21.5	34.6	47.6	0.6	13.2	25.8	38.9	20 10 0.31	.20	. .	.60	20 9 33.91	9.85	
	34	β² Capricorni	12.2	25.3	38.6	51.5	4.4	16.9	30.0	20 12 51.27	+ 0 0.21	. .	.60	20 12 24.88	+ 9.99	
	†35	λ Ursæ Minoris	..	..	..	..	24.5	35.8	24.5	20 37 48.27	—21 3.47	. .	.61	20 16 18.19	—204.81	
	36	ε Aquarii	12.0	25.1	37.6	50.3	2.9	15.2	28.1	20 39 50.17	+ 0 0.20	. .	.61	20 39 23.76	+ 9.56	
	37	Moon, 1st L.	26.5	40.0	53.2	6.2	19.3	32.1	45.8	20 59 6.16	.20	+ 69.63	.62	20 59 49.37	. .	
	38	β Aquarii	19.1	32.0	44.7	57.1	9.9	21.8	34.7	21 23 57.04	.19	. .	.63	21 23 30.60	8.98	
	39	ε Pegasi	29.2	42.0	54.8	7.6	20.0	32.5	45.2	21 37 7.33	.16	. .	.65	21 36 40.86	8.15	
	40	Saturn, 1st L.	17.1	30.2	43.4	56.3	9.2	21.7	35.0	21 50 56.13	+ 0 0.20	+ 0.62	.64	21 50 30.31	. .	
	41	α Gruis	..	23.5	42.4	0.8	19.4	37.3	56.2	21 59 9.93	— 0 9.06	. .	.64	21 58 34.23	10.85	
	42	ϑ Aquarii	34.3	47.2	0.0	12.9	25.2	37.4	50.8	22 9 12.54	+ 0 0.19	. .	.64	22 8 46.09	8.86	
	43	γ Aquarii	34.8	47.2	0.0	12.5	25.0	37.0	50.0	22 14 12.36	.17	. .	.64	22 13 45.89	8.59	
	44	Lacertæ, (7880)	43.9	0.0	16.5	32.3	48.4	3.9	20.5	22 29 32.21	.07	. .	.65	22 29 5.65	7.19	
	45	λ Aquarii	27.0	40.0	52.6	5.1	17.8	30.0	42.8	22 45 5.04	.19	. .	.66	22 44 38.57	8.63	
	46	α Piscis Aust.	54.5	9.1	24.0	38.4	52.8	7.0	22.0	22 49 38.26	.23	. .	.66	22 49 11.83	9.29	
1	47	Sun, 1st L.	35.3	47.9	0.8	13.4	25.8	37.8	51.0	12 29 13.13	.19	. .	27.30	12 29 50.28	. .	K.
	48	Sun, 2d L.	43.8	56.7	9.2	21.8	34.1	46.7	59.3	12 31 21.66	.19					
	49	γ Aquilæ	47.9	0.9	13.6	26.4	39.0	51.2	4.3	19 39 26.19	+ 0 0.16	. .	.25	19 38 59.10	8.44	
	50	α Aquilæ	..	..	..	46.4	58.8	11.2	24.1	19 44 5.13	— 0 18.76	. .	.25	19 43 19.12	8.63	
	51	α² Capricorni	22.2	35.1	48.2	1.0	13.5	26.3	39.5	20 10 0.83	+ 0 0.20	. .	.25	20 9 33.78	+ 9.87	
	52	λ Ursæ Minoris	20.0	2.0	38.0	4.5	25.0	37.0	..	20 11 41.08	+ 5 6.72	. .	— 27.25	20 16 20.55	—203.64	

35. λ Ursæ Minoris very steady, and observation good.

DATE.	VALUE OF m.	n.	c.	CLOCK. At 19h.	H. Rate. 0s.
	s.	s.	s.	s.	
Sept. 28	+0.394	—0.190	0.000	f 25.55	g .020
" 29	.265	.106	—0.086	26.26	.020
" 30	.265	.106	.086	26.59	.020
Oct. 1	+0.265	—0.106	—0.086	27.24	l .006

APPARENT RIGHT ASCENSIONS OBSERVED WITH THE WEST TRANSIT INSTRUMENT.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
Oct. 1	1	61¹ Cygni	42.7	58.7	15.0	30.8	46.6	2.0	..	21 0 22.63	+ 0 8.01	. .	— 27.24	21 0 3.40	+ 7.15	K
	2	ν Aquarii	..	..	..	..	..	8.0	20.9	21 2 14.45	— 0 31.73	. .	.24	21 1 15.48	9.52	
	3	Moon, 1st L.	3.3	16.2	29.5	42.6	55.0	8.2	21.6	21 58 42.34	+ 0 0.19	+ 69.00	.24	21 59 24.29	. .	
	4	α Andromedæ	14.9	29.3	43.7	58.0	12.1	25.8	40.4	0 0 57.74	0.11	. .	.23	0 0 30.62	7.86	
	5	γ Pegasi	10.9	24.1	37.1	49.9	2.9	15.5	28.7	0 5 49.87	.15	. .	.23	0 5 22.79	+ 8.12	
	6	Polaris	54.0	58.5	57.5	..	..	..	..	1 49 56.67	15 45.45	. .	.22	1 5 14.90	— 11.77	
2	7	Sun, 1st L.	12.0	24.9	37.8	49.7	2.5	14.8	27.9	12 32 49.94	0 0.19	. .	26.77	12 33 27.74	. .	
	8	Sun, 2d L.	21.0	33.3	46.3	58.8	11.5	23.4	36.6	12 34 58.70	.19					
3	9	γ Aquilæ	47.4	0.1	13.2	25.9	38.4	51.2	3.7	19 39 25.70	.16	. .	.61	19 38 59.25	+ 8.49	
	10	α Aquilæ	7.2	20.3	33.0	45.7	58.2	10.6	23.3	19 43 45.47	.16	. .	.61	19 43 19.02	8.68	
	11	ϑ Aquilæ	13.4	26.1	38.6	51.1	3.4	15.6	28.8	20 3 51.00	.18	. .	.61	20 3 24.57	9.16	
	12	α² Capricorni	21.4	34.2	47.3	0.2	13.1	25.5	38.6	20 10 0.04	+ 0 0.20	. .	.61	20 9 33.63	+ 9.91	
	13	λ Ursæ Minoris	..	..	..	4.0	26.0	..	23.5	20 30 57.83	—14 10.04	. .	.61	20 16 21.18	—201.47	
	14	α Cygni	47.4	5.3	23.1	40.8	58.2	15.1	33.3	20 36 40.46	+ 0 0.04	. .	.61	20 36 13.89	+ 5.17	
5	15	α Aquilæ	7.6	20.3	33.1	45.9	58.2	10.7	23.7	19 43 45.64	.16	. .	.74	19 43 19.06	8.71	K.
	16	β Aquilæ	36.6	49.3	2.0	14.8	26.9	39.2	52.3	19 48 14.44	+ 0 0.17	. .	.74	19 47 47.87	+ 8.77	
	17	λ Ursæ Minoris	18.0	..	..	..	27.0	..	28.0	20 20 24.33	— 3 35.91	. .	.74	20 16 21.68	—199.46	
	18	α Cygni	47.6	5.3	23.1	40.8	58.3	15.5	33.4	20 36 40.57	+ 0 0.04	. .	.74	20 36 18.87	+ 5.22	
	19	61¹ Cygni	42.3	58.4	14.5	30.4	46.1	1.6	17.8	21 0 30.16	+ 0 0.07	. .	.74	21 0 3.49	7.24	
	20	ζ Cygni	..	..	38.6	53.2	7.6	21.3	36.1	21 7 7.36	— 0 14.32	. .	.74	21 6 26.30	6.85	
	21	β Aquarii	18.9	32.0	44.6	57.0	9.8	21.9	34.8	21 23 57.00	+ 0 0.19	. .	.74	21 23 30.45	9.04	
	22	ε Pegasi	29.3	42.3	55.1	7.6	20.3	32.7	45.4	21 37 7.53	.16	. .	.74	21 36 40.95	8.20	
	†23	Saturn, 1st L.	28.8	..	55.2	..	20.9	..	46.9	21 50 7.95	.21	. .	.74	21 49 41.98	. .	
	24	Saturn, 2d L.	..	43.2	..	9.3	..	34.8	..	21 50 9.10	+ 0 0.19					
	25	α Gruis	..	..	..	..	..	..	56.7	21 59 56.70	— 0 55.49	. .	.74	21 58 34.47	10.92	
	26	γ Pegasi	..	23.4	36.7	49.8	2.2	15.0	28.1	0 5 55.87	6.33	. .	.73	0 5 22.81	8.11	
	27	α Cassiopeiæ	14.0	36.4	59.0	21.2	43.0	4.5	27.3	0 32 20.77	0.04	. .	.73	0 31 54.00	7.38	
	28	β Ceti	..	55.4	8.8	22.0	35.1	47.9	1.4	0 36 28.43	— 0 6.23	. .	.73	0 35 55.47	8.15	
	29	Herschel	54.9	7.6	20.2	32.7	45.1	57.3	10.3	0 46 32.59	+ 0 0.17	. .	.73	0 46 6.03	. .	
	30	ε Piscium	50.0	3.0	15.6	28.1	40.6	52.9	5.8	0 55 28.00	+ 0 0.16	. .	.73	0 55 1.43	+ 8.27	
	31	Polaris	58.0	1.0	1.0	55.0	50.0	34.0	42.0	1 5 51.57	— 0 7.00	. .	.73	1 5 17.84	— 12.27	
	32	ϑ Ceti	12.0	24.7	37.4	50.2	2.7	15.0	28.1	1 16 50.01	+ 0 0.19	. .	.73	1 16 23.47	+ 8.05	
	33	ν Piscium	18.2	30.8	43.6	56.0	8.5	20.8	33.7	1 33 55.94	.17	. .	.73	1 33 29.38	8.33	
	34	Moon, 2d L.	23.0	36.2	49.3	2.5	15.3	28.2	41.8	1 56 2.33	+ 0 0.16	— 68.86	.73	1 54 26.90	. .	
	35	α Arietis	..	34.0	47.8	1.7	15.1	28.3	42.0	1 59 8.15	— 0 6.69	. .	.73	1 58 34.73	+ 8.87	A.
6	36	Sun, 1st L.	45.3	58.1	10.8	23.2	35.9	47.9	1.1	12 47 23.19	+ 0 0.19	. .	.34	12 48 1.61	. .	
	37	Sun, 2d L.	54.3	7.2	20.0	32.5	45.0	57.3	10.0	12 49 32.33	+ 0 0.19					
	†38	λ Ursæ Minoris	..	51.5	23.5	54.0	18.0	29.0	19.0	20 22 2.50	— 5 25.10	. .	.33	20 16 11.07	—198.42	
	39	61¹ Cygni	42.0	57.9	14.0	29.5	45.6	0.8	17.2	21 0 29.57	+ 0 0.07	. .	.33	21 0 3.31	+ 7.26	
	40	ζ Cygni	9.1	24.2	38.2	52.9	7.0	21.0	35.5	21 6 52.56	+ 0 0.10	. .	.33	21 6 26.33	6.88	
	41	σ Cygni	..	19.5	36.0	52.0	8.0	23.3	39.7	21 11 59.75	— 0 8.00	. .	.33	21 11 25.42	6.05	
	42	α Cephei	3.8	30.3	57.4	24.2	50.0	16.0	43.4	21 15 23.59	— 0 0.12	. .	.33	21 14 57.14	2.21	
	43	β Aquarii	18.7	31.2	44.0	56.8	9.2	21.6	34.5	21 23 56.57	+ 0 0.19	. .	.33	21 23 30.43	+ 9.05	
	44	β² Cephei	..	..	33.7	9.8	46.0	21.5	59.0	21 27 46.00	— 0 36.73	. .	.33	21 26 42.94	— 0.81	
	45	δ Capricorni	22.6	36.2	49.0	2.2	15.1	27.8	41.0	21 39 1.99	+ 0 0.21	. .	.33	21 38 35.87	+ 9.51	
	46	Saturn, 1st L.	19.8	..	46.0	..	12.0	..	38.0	21 49 58.95	.21	. .	.33	21 49 33.39	. .	
	47	Saturn, 2d L.	..	34.5	..	0.3	..	25.5	..	21 50 0.10	+ 0 0.19					
7	48	Polaris	..	..	..	..	27.0	25.0	30.0	13 21 27.33	—15 46.31	. .	.66	13 5 14.36	— 12.61	K.
	49	α Aquilæ	7.5	20.3	33.0	45.8	58.2	10.8	23.4	19 43 45.57	+ 0 0.16	. .	.65	19 43 19.08	+ 8.75	
	50	β Aquilæ	36.5	49.1	2.0	14.4	26.9	39.3	52.0	19 48 14.31	+ 0 0.17	. .	.65	19 47 47.83	8.81	
	51	α² Capricorni	..	34.3	47.3	0.3	13.0	25.7	38.8	20 10 6.57	— 0 6.25	. .	.65	20 9 33.67	+ 9.97	
	52	λ Ursæ Minoris	..	57.5	..	0.0	23.0	..	24.0	20 22 11.12	— 5 25.70	. .	— 26.65	20 16 18.77	—197.35	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 20h.	H. Rate. 0s.
	s.	s.	s.	s.	
Oct. 1	+0.265	—0.106	—0.086	f 27.24	l .006
" 3	.265	.106	.086	26.61	.005
" 5	.265	.106	.086	26.74	.002
" 6	.265	.106	.086	26.33	.001
" 7	+0.265	—0.106	—0.086	26.65	l .001

23. Stars unsteady.
38. λ Ursæ Minoris steady, and observation excellent.

E.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to **1850.0**	Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			S.	S.	S.	S.	S.	S.	S.	H. M. S.	M. S.	S.	S.	H. M. S.	S.	
7	1	61^1 Cygni	..	58.1	14.3	30.1	45.9	1.3	17.6	21 0 37.88	— 0 7.90	. .	— 26.65	21 0 3.33	+ 7.28	K.
	2	ζ Cygni	9.6	24.1	38.7	53.1	7.3	21.1	36.0	21 6 52.84	+ 0 0.10	. .	.65	21 6 26.29	6.89	
	3	β Aquarii	19.0	31.9	44.6	57.0	9.7	21.8	34.7	21 23 56.96	+ 0 0.19	. .	.65	21 23 30.50	9.06	
	4	Saturn, 1st L.	..	..	38.1	..	3.8	..	29.7	21 50 3.87	— 0 12.78	. .	.65	21 49 24.94	. .	
	5	Saturn, 2d L.	..	..	..	52.2	..	17.5	..	21 50 4.85	12.76					
	6	α Gruis	..	..	42.4	1.0	19.3	37.2	56.4	21 59 19.26	18.36	. .	.65	21 58 34.25	+ 10.96	
	7	Polaris	..	..	..	..	..	27.0	39.5	0 25 33.25	—19 55.89	. .	.65	0 5 10.71	— 12.77	
	8	Venus	44.0	56.9	9.6	22.4	34.7	46.7	59.9	11 55 22.03	+ 0 0.18	. .	.63	11 54 55.58	. .	A.
8	9	Sun, 1st L.	3.6	16.5	29.3	41.7	54.3	6.5	19.5	12 54 41.63	.19	. .	.24	12 55 20.35	. .	
	10	Sun, 2d L.	13.2	26.0	38.8	51.2	3.9	16.1	29.0	12 56 51.17	.19					
	11	α Bootis	25.5	39.1	52.3	5.9	19.1	31.8	45.6	14 9 5.61	+ 0 0.13	. .	.24	14 8 39.50	+ 9.84	
	12	λ Ursæ Minoris	..	..	27.5	0.5	18.5	39.0	21.0	20 27 21.30	—10 39.81	. .	.23	20 16 15.26	—196.22	
	13	61^1 Cygni	41.7	58.0	13.7	29.6	45.3	1.0	17.2	21 0 29.50	+ 0 0.07	. .	.23	21 0 3.34	+ 7.29	
	14	ζ Cygni	9.2	23.7	38.1	52.7	6.9	20.9	35.2	21 6 52.39	+ 0 0.10	. .	.23	21 6 26.26	6.91	
	15	σ Cygni	..	19.6	35.9	51.9	7.6	23.3	39.9	21 11 51.63	— 0 8.00	. .	.23	21 11 17.40	6.10	
	16	α Cephei	3.6	30.7	57.4	24.1	50.6	16.2	43.4	21 15 23.71	— 0 0.12	. .	.23	21 14 57.36	2.29	
	17	β Aquarii	18.6	31.0	44.0	56.4	9.2	21.1	34.2	21 23 56.36	+ 0 0.18	. .	.23	21 23 30.32	+ 9.08	
	18	β Cephei	..	56.8	33.6	9.5	45.9	21.3	58.4	21 27 27.58	— 0 18.53	. .	.23	21 26 42.82	— 0.71	
	19	ε Pegasi	28.7	41.5	54.2	6.9	19.6	31.8	44.9	21 37 6.80	+ 0 0.16	. .	.23	21 36 40.73	+ 8.24	
	20	Saturn, 1st L.	3.3	..	29.9	..	55.3	..	21.3	21 49 42.45	.21	. .	.23	21 49 17.08	. .	
	21	Saturn, 2d L.	..	17.9	..	44.1	..	9.3	..	21 49 43.78	+ 0 0.19					
	22	α Gruis	3.9	23.0	..	0.2	18.7	36.8	56.0	21 59 3.10	— 0 2.80	. .	.23	21 58 34.07	10.98	
	23	γ Aquarii	34.1	47.0	59.4	12.0	24.4	36.3	49.3	22 14 11.79	+ 0 0.18	. .	.23	22 13 45.74	8.66	
	24	η Aquarii	18.4	31.3	44.0	56.5	8.9	21.0	33.9	22 27 56.29	.18	. .	.23	22 27 30.24	+ 8.54	
	25	Herschel	27.6	40.2	52.8	5.3	17.8	30.0	42.9	0 46 5.23	+ 0 0.17	. .	.22	0 45 39.18	. .	
	26	Polaris	53.0	53.5	56.5	56.0	46.0	27.0	39.0	1 5 47.57	— 0 7.00	. .	.22	1 5 14.35	— 12.92	
	27	ϑ^1 Ceti	11.4	24.4	37.1	49.9	2.3	14.6	27.7	1 16 49.63	+ 0 0.19	. .	.22	1 16, 23.60	+ 8.03	
9	†28	Sun, 1st L.	..	..	..	..	..	47.0	0.2	12 58 53.60	— 0 31.24	. .	.59	12 59 0.45	. .	K.
	29	Sun, 2d L.	53.5	6.3	19.0	31.8	44.2	56.5	9.5	13 0 31.54	+ 0 0.19					
	30	Polaris, S. P.	34.0	48.5	36.0	30.5	20.0	22.5	28.0	13 5 31.36	11.39	. .	.59	13 5 16.16	— 13.02	
	31	η Ursæ Majoris	55.4	15.2	34.9	54.4	13.7	32.8	52.7	13 41 54.16	.00	. .	.59	13 41 27.57	+ 9.80	
	32	α^2 Capricorni	21.4	34.4	47.2	0.2	13.1	25.4	38.6	20 10 0.04	+ 0 0.20	. .	.67	20 9 33.57	+ 10.00	
	†33	λ Ursæ Minoris	13.0	58.0	39.0	58.0	26.5	40.5	36.0	20 16 55.86	— 0 14.48	. .	.67	20 16 14.71	—195.01	
	34	61^1 Cygni	42.0	58.2	14.0	30.3	45.9	1.4	17.8	21 0 29.94	+ 0 0.07	. .	.68	21 0 3.33	+ 7.31	
	35	ζ Cygni	9.5	23.9	38.8	53.0	7.4	21.4	36.2	21 6 52.89	.10	. .	.68	21 6 26.31	6.93	
	36	β Aquarii	19.0	31.7	44.4	56.9	9.3	21.7	34.8	21 23 56.83	.19	. .	.69	21 23 30.33	9.08	
	37	ε Pegasi	29.1	41.9	54.7	7.5	20.0	32.4	45.3	21 37 7.27	.16	. .	.69	21 36 40.75	8.25	
	38	Saturn, 1st L.	56.0	..	22.2	..	48.3	..	14.3	21 49 35.20	.21	. .	.69	21 49 9.26	. .	
	39	Saturn, 2d L.	..	10.4	..	36.5	..	2.0	..	21 49 36.30	.19					
	40	α Aquarii	44.7	57.4	10.0	22.7	35.1	..	..	21 58 9.94	12.67	. .	.69	21 57 55.92	8.66	
	41	ζ Pegasi	39.0	51.9	4.6	17.3	30.0	42.3	55.2	22 34 17.19	+ 0 0.16	. .	.70	22 80 50.65	8.12	
	42	α Piscis Aust.	..	9.1	23.5	33.5	52.7	6.9	21.8	22 49 45.42	— 0 7.19	. .	.70	22 49 11.53	9.35	
	43	α Pegasi	57.0	10.2	23.2	36.2	49.0	1.6	15.0	22 57 36.03	+ 0 0.15	. .	.71	22 57 9.47	7.97	
	44	ι Piscium	54.6	7.1	19.8	32.3	44.8	57.1	10.1	23 32 32.26	.17	. .	.71	23 32 5.72	8.39	
	45	Venus	53.3	6.1	18.8	31.3	43.9	56.0	8.9	12 4 31.19	.18	. .	.86	12 4 4.51	. .	A.
10	46	Sun, 1st L.	24.5	37.0	49.9	2.6	15.2	27.5	40.4	13 2 2.44	.19	. .	.47	13 2 41.09	. .	
	47	Sun, 2d L.	34.2	47.0	0.1	12.4	24.9	37.2	50.3	13 4 12.30	.19					
	48	π Sagittarii	25.2	38.9	52.1	5.4	19.0	32.0	45.9	19 1 5.50	.22	. .	.58	19 0 39.14	11.11	
	49	η Lyræ	10.9	27.0	43.3	59.1	15.2	31.0	47.1	19 8 59.09	.07	. .	.58	19 8 32.58	6.20	
	50	ρ^1 Sagittarii	34.0	47.1	0.5	13.9	26.9	39.7	53.0	19 13 13.59	.21	. .	.58	19 12 47.22	10.78	
	51	δ Aquilæ	35.1	47.9	0.7	13.1	25.3	37.6	50.2	19 18 12.84	.18	. .	.59	19 17 46.43	9.28	
	52	β^1 Cygni	16.9	31.0	45.2	59.4	13.4	27.0	41.6	19 24 59.21	+ 0 0.12	. .	— 26.59	19 24 32.74	+ 7.27	

28. Observed on micrometer wire No. 2; very steady, and beautifully defined.
33. Observed on micrometer wire No. 2.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	*n.*	*c.*	At 20*h.*	0*s.*
	S.	S.	S.	S.	
Oct. 7	+0.265	—0.106	—0.086	*f* 26.65	*l* .001
" 8	.265	.106	.086	26.23	.002
" 9	.265	.106	.086	26.67	*g* .012
" 10	+0.265	—0.106	—0.086	26.60	*g* .019

APPARENT RIGHT ASCENSIONS OBSERVED WITH THE WEST TRANSIT INSTRUMENT.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	S.	S.	H. M. S.	S.	
Oct. 10	1	ε² Sagittarii	32.5	45.7	59.0	11.9	24.4	37.3	50.8	19 34 11.66	+ 0 0.21	. .	— 26.59	19 33 45.28	+ 10.53	A.
	2	α Cygni	..	5.1	22.8	40.4	57.9	15.0	33.1	20 36 49.05	— 0 8.80	. .	.61	20 36 13.64	5.34	
	3	ε Aquarii	11.4	24.2	37.1	50.0	2.8	15.0	27.8	20 39 49.76	+ 0 0.20	. .	.61	20 39 23.35	9.57	
	4	μ Aquarii	12.1	25.0	37.7	50.5	3.0	15.2	28.0	20 44 50.21	.20	. .	.61	20 44 23.80	9.55	
	5	61¹ Cygni	41.9	57.9	14.0	30.1	45.8	1.1	17.2	21 0 29.71	+ 0 0.07	. .	.62	21 0 3.16	+ 7.33	
	6	β² Cephei	19.8	57.1	33.0	9.9	45.9	21.3	58.2	21 27 9.31	— 0 0.27	. .	.63	21 26 42.41	— 0.61	
	7	Saturn, 1st L.	49.0	1.9	15.0	28.0	40.9	53.4	6.5	21 49 27.81	+ 0 0.20	+ 0.61	.63	21 49 1.99	. .	
	8	α Lacertæ	28.8	14.8	30.4	46.0	1.9	17.0	33.0	22 9 45.98	.08	. .	.64	22 9 19.42	+ 6.58	
	9	α Piscis Aust.	54.2	9.1	23.3	38.0	52.8	6.6	21.5	22 49 37.94	+ 0 0.23	. .	.65	22 49 11.52	9.36	
	10	ο Andromedæ	..	48.1	5.0	22.0	38.4	54.4	11.9	22 55 29.97	— 0 8.24	. .	.66	22 54 55.07	6.62	
	11	h Pegasi	26.0	40.1	53.9	7.7	21.2	34.7	48.9	23 0 7.50	+ 0 0.12	. .	.66	22 59 40.96	7.59	
	12	m Piscium	24.4	37.0	49.5	2.2	14.4	27.0	39.5	23 39 2.00	+ 0 0.18	. .	.67	23 38 35.51	8.25	
14	13	Sun, 2d L.	..	..	..	..	14.8	27.2	40.3	13 19 27.43	— 0 25.05	— 65.11	28.71	13 17 28.56	. .	K.
	14	η Ursæ Majoris	..	..	37.0	56.4	15.9	34.8	54.8	13 42 15.78	19.54	. .	.72	13 41 27.52	9.86	
	15	α² Capricorni	..	..	..	..	..	27.7	40.8	20 10 34.25	32.46	. .	.84	20 9 32.95	+ 10.09	
	16	λ Ursæ Minoris	..	..	..	54.0	15.0	..	14.0	20 30 47.67	14 10.45	. .	.85	20 16 8.37	—188.68	
	17	α Cygni	..	..	..	42.7	0.0	17.3	35.4	20 37 8.85	— 0 26.40	. .	.85	20 36 13.60	+ 5.45	
	18	61¹ Cygni	44.1	0.4	16.2	32.0	47.8	3.4	19.7	21 0 31.94	+ 0 0.07	. .	.86	21 0 3.15	7.42	
	19	ζ Cygni	11.6	26.0	40.7	55.0	9.3	23.5	38.1	21 6 54.89	.10	. .	.86	21 6 26.13	7.02	
	†20	β Aquarii	20.9	33.8	46.4	59.3	11.8	23.9	36.8	21 23 58.99	.19	. .	.87	21 23 30.31	9.16	
	21	α Aquarii	46.8	59.6	12.2	25.0	37.2	49.3	2.4	21 58 24.64	.19	. .	.88	21 57 55.95	8.72	
	22	ζ Pegasi	..	54.2	..	..	..	..	..	22 33 54.20	25.58	. .	.89	22 33 50.89	8.16	
	23	ι Piscium	56.7	9.5	22.3	34.8	47.0	59.4	12.1	23 32 34.54	0.17	. .	.91	23 32 5.80	8.41	
	24	γ Pegasi	12.7	26.0	38.9	51.8	4.6	17.0	30.4	0 5 51.63	+ 0 0.15	. .	.92	0 5 22.86	+ 8.10	
15	25	λ Ursæ Minoris	..	..	..	..	1.0	11.0	50.0	20 37 20.67	—21 5.42	. .	29.05	20 15 46.20	—187.45	A.
	26	61¹ Cygni	44.3	0.3	16.2	32.6	48.1	3.5	19.9	21 0 32.13	+ 0 0.07	. .	.05	21 0 3.15	+ 7.44	
	27	ζ Cygni	11.8	26.3	41.0	55.4	9.5	23.7	38.3	21 6 55.14	.10	. .	.06	21 6 26.18	7.04	
	28	σ Cygni	6.0	22.4	38.3	54.5	10.2	26.0	42.2	20 11 54.23	+ 0 0.07	. .	.06	21 11 25.24	6.24	
	29	α Cephei	6.2	33.1	59.9	26.4	52.8	18.9	46.0	21 15 26.19	— 0 0.12	. .	.06	21 14 57.01	2.56	
	30	β Aquarii	21.3	34.1	47.0	59.4	11.8	24.0	37.2	21 23 59.26	+ 0 0.19	. .	.06	21 23 30.39	9.18	
	31	δ Capricorni	25.3	38.2	51.4	4.9	17.4	30.5	43.9	21 39 4.51	.21	. .	.06	21 38 35.66	9.65	
	32	Saturn, 1st L.	20.7	33.7	46.9	0.0	12.8	25.0	38.4	21 48 59.64	.20	+ 0.61	.07	21 48 31.38	. .	
	33	α Aquarii	47.2	59.4	12.2	25.0	37.1	49.2	2.2	21 58 24.61	.18	. .	.07	21 57 55.72	8.74	
	34	α Lacertæ	1.0	17.0	32.6	48.3	3.8	19.0	35.4	22 9 48.16	.08	. .	.07	22 9 19.17	6.66	
	35	γ Aquarii	36.7	49.6	2.2	14.7	27.1	39.3	52.2	22 14 14.54	.18	. .	.07	22 13 45.65	8.73	
	36	η Aquarii	21.6	34.0	46.4	59.3	11.8	23.9	36.9	22 27 59.13	.18	. .	.07	22 27 30.24	8.61	
	37	ζ Pegasi	41.2	54.1	7.0	19.7	32.0	44.6	57.7	22 34 19.47	.16	. .	.08	22 33 50.55	8.18	
	38	λ Aquarii	29.2	42.1	54.9	7.4	20.9	32.2	45.1	22 45 7.27	.19	. .	.08	22 44 38.38	8.74	
	39	α Piscis Aust.	56.5	11.9	26.0	40.7	55.1	9.2	24.3	22 49 40.53	.23	. .	.08	22 49 11.68	9.42	
	40	α Pegasi	59.7	12.5	25.6	38.7	51.2	4.1	17.1	22 57 38.41	.15	. .	.08	22 57 9.48	8.01	
	41	γ Piscium	6.1	19.0	31.5	44.0	56.2	8.5	21.5	23 9 43.83	.19	. .	.08	23 9 14.94	8.50	
	42	ι Piscium	57.0	9.9	22.4	34.9	47.4	59.5	12.2	23 32 34.76	+ 0 0.17	. .	.09	23 32 5.84	+ 8.41	
16	43	Sun, 1st L.	..	..	..	..	32.8	45.1	58.3	13 24 45.40	— 0 25.10	. .	.88	13 24 55.42	. .	K.
	44	Sun, 2d L.	52.2	5.0	18.0	30.7	43.2	55.7	8.7	13 26 30.50	0.20					
	45	λ Ursæ Minoris	..	..	..	..	..	23.0	13.0	20 42 48.00	—26 19.63	. .	.98	20 15 58.39	—186.28	
	46	ι Piscium	58.3	10.7	23.4	35.8	48.4	0.7	13.3	23 32 35.80	+ 0 0.17	. .	30.02	23 32 5.95	+ 8.42	
	47	α Andromedæ	17.9	32.3	46.7	0.9	14.9	28.9	43.3	0 1 0.70	.12	. .	.03	0 0 30.79	7.87	
	48	γ Pegasi	13.9	27.0	40.1	53.0	5.8	18.3	31.7	0 5 52.83	+ 0 0.17	. .	.03	0 5 22.97	8.12	
	49	α Cassiopeiæ	17.2	40.0	2.2	24.6	46.7	8.1	30.9	0 32 24.24	— 0 0.04	. .	.03	0 31 54.17	+ 7.33	
	50	Herschel	20.6	33.2	46.0	58.7	10.9	23.1	36.1	0 44 58.37	+ 0 0.17	. .	.03	0 44 28.51	. .	
	51	Polaris	54.5	59.0	..	..	..	..	..	0 45 56.75	+19 47.57	. .	.04	0 5 14.28	— 12.95	
	52	γ Ursæ Majoris . . .	7.4	29.3	51.0	12.8	34.0	55.0	17.1	11 46 12.37	— 0 0.04	. .	— 29.83	11 45 42.50	+ 12.45	A.

DATE.	VALUE OF m.	n.	c.	CLOCK. At 20h.	H. Rate. 0s.
	s.	s.	s.	s.	
Oct. 10	+0.265	—0.106	—0.086	f 26.60	g .019
" 14	.265	.106	.086	28.84	.019
" 15	.265	.106	.086	29.05	.014
" 16	+0.265	—0.106	—0.086	29.98	g .014

20. Stars remarkably unsteady.

E. i.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CORRECTIONS FOR Inst.	Semi-diam.	Clock.	Observed R. Ascensions.	Reduction to 1850.0	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. s.	M. s.	s.	s.	H. M. s.	s.	
16	1	Polaris, S. P.	58.0	..	44.5	29.0	36.0	30.0	..	13 4 3.50	+ 1 40.76	. .	— 29.48	13 5 14.78	— 12.96	A.
17	2	Sun, 1st L.	26.2	39.0	51.9	4.4	17.0	29.2	42.4	13 28 4.30	0.20	. .	.92	13 28 40.01	. .	
	3	Sun, 2d L.	36.9	49.8	2.7	15.3	28.0	40.2	53.3	13 30 15.17	.20					
	4	α Bootis	29.0	42.7	56.2	9.6	22.8	35.5	49.2	14 9 9.29	.13	. .	.93	14 8 39.49	+ 9.86	
	5	υ Aquarii	6.9	19.8	32.5	45.2	58.0	10.3	23.2	21 1 45.13	.20	. .	30.05	21 1 15.28	9.66	
	6	ζ Cygni	12.6	27.3	41.9	56.2	10.4	24.2	39.1	21 6 55.96	.10	. .	.05	21 6 26.01	7.08	
	7	σ Cygni	6.9	23.0	39.2	55.2	11.2	26.9	43.3	21 11 55.10	.07	. .	.05	21 11 25.12	6.35	
	8	β Aquarii	22.2	35.1	47.8	0.3	12.9	25.0	37.9	21 24 0.17	+ 0 0.19	. .	.05	21 23 30.31	+ 9.20	
	9	β² Cephei	..	59.9	36.6	13.0	49.1	24.3	1.9	21 27 30.80	— 0 18.54	. .	.06	21 26 42.20	— 0.24	
	10	ε Pegasi	32.4	45.2	58.0	10.9	23.2	35.6	48.4	21 37 10.53	+ 0 0.16	. ..	.06	21 36 40.63	+ 8.36	
	11	Saturn, 1st L.	11.8	25.0	37.9	50.8	3.7	16.4	29.5	21 48 50.73	.20	+ 0.61	.06	21 48 21.48	. .	
	12	α Gruis	7.8	26.6	45.2	3.9	22.2	40.2	59.4	21 59 3.61	.27	. .	.06	21 58 33.82	11.16	
	13	α Lacertæ	2.2	18.0	34.0	49.6	5.0	20.3	36.4	22 9 49.36	.07	. .	.07	22 9 19.36	6.69	
	14	γ Aquarii	37.9	50.4	3.0	15.8	27.9	40.0	53.0	22 14 15.43	.18	. .	.07	22 13 45.54	8.75	
	15	Lacertæ, (7880)	47.2	3.3	19.5	35.9	51.8	7.4	23.9	22 29 35.57	.06	. .	.07	22 29 5.56	7.43	
	16	ζ Pegasi	42.3	55.1	8.0	20.8	33.2	45.7	58.8	22 34 20.56	+ 0 0.16	. .	.07	22 33 50.65	8.20	
19	17	Sun, 2d L.	..	..	34.3	47.0	59.7	12.1	25.2	13 37 59.66	— 0 12.54	— 65.54	.97	13 36 10.61	. .	K.
	18	α Cygni	..	9.7	27.1	45.1	2.0	19.5	37.3	20 36 53.45	— 0 8.83	. .	31.23	20 36 13.39	5.58	
	19	61¹ Cygni	46.2	2.5	18.5	34.8	50.1	5.7	21.8	21 0 34.23	+ 0 0.07	. .	.25	21 0 3.05	7.52	
	20	ζ Cygni	13.7	28.3	43.0	57.6	11.3	26.0	40.5	21 6 57.20	.10	. .	.25	21 6 26.05	7.11	
	21	ε Pegasi	33.7	46.8	59.4	11.8	24.5	36.8	49.8	21 37 11.83	.16	. .	.27	21 36 40.72	8.39	
	22	α Aquarii	49.4	2.2	14.7	26.9	39.7	52.0	4.4	21 58 27.04	.18	. .	.28	21 57 55.94	8.79	
	23	ζ Pegasi	43.5	56.3	9.2	22.0	34.6	47.0	0.3	22 34 21.84	.16	. .	.31	22 33 50.69	8.22	
	24	α Pegasi	1.6	14.7	27.5	40.9	53.6	6.0	19.3	22 57 40.51	.15	. .	.32	22 57 9.34	+ 8.05	
	†25	Polaris, S. P.	0.5	6.0	48.0	36.0	38.0	36.5	42.0	13 5 46.71	12.18	. .	.48	13 5 27.41	— 12.85	A.
20	26	Sun, 1st L.	44.0	57.0	10.0	22.9	35.5	47.8	0.4	13 39 22.51	.20	. .	.57	13 39 56.90	. .	
	27	Sun, 2d L.	55.5	8.6	21.3	34.2	47.0	59.3	12.3	13 41 34.03	.20					
	28	61¹ Cygni	46.9	3.1	18.9	35.2	50.6	6.2	22.4	21 0 34.76	.07	. .	.78	21 0 3.05	+ 7.54	
	29	ζ Cygni	14.4	29.1	43.5	58.1	12.0	26.2	40.9	21 6 57.74	.10	. .	.78	21 6 26.06	7.13	
	30	σ Cygni	8.7	24.8	41.0	57.0	13.0	28.7	45.0	21 11 56.89	+ 0 0.07	. .	.78	21 11 25.18	6.35	
	31	α Cephei	8.7	35.8	2.4	28.8	55.2	21.2	48.3	21 15 28.63	— 0 0.13	. .	.79	21 14 56.71	+ 2.76	
21	32	λ Ursæ Minoris	..	..	..	..	..	21.0	..	20 37 21.00	21 1.46	. .	32.80	20 15 46.74	—180.69	K.
	33	ζ Cygni	..	..	44.3	58.9	13.3	27.2	41.9	21 7 13.12	— 0 14.32	. .	.82	21 6 25.98	+ 7.15	
	34	β Aquarii	25.2	38.0	50.4	3.0	15.4	28.0	40.8	21 24 2.97	+ 0 0.19	. .	.83	21 23 30.33	9.26	
	35	ε Pegasi	..	..	..	13.7	26.0	38.3	51.7	21 37 32.42	— 0 18.86	. .	.84	21 36 40.72	8.42	
	36	α Aquarii	..	3.4	16.2	29.0	41.2	53.2	6.1	21 58 34.85	6.10	. .	.86	21 57 55.89	8.81	
	37	ζ Pegasi	..	..	..	..	..	48.6	1.7	22 34 55.15	— 0 31.56	. .	.88	22 33 50.71	8.24	
	38	α Pegasi	3.5	16.3	29.6	42.3	55.1	7.8	20.9	22 57 42.16	+ 0 0.15	. .	.90	22 57 9.41	8.07	
	39	ι Piscium	0.9	13.6	26.2	38.7	51.2	3.3	16.5	23 32 38.63	.17	. .	.92	23 32 5.88	8.45	
	40	Peyassi, (8284)	46.7	1.0	15.5	29.6	43.7	57.4	11.8	23 42 29.39	.11	. .	.92	23 41 56.58	7.74	
	41	ϑ¹ Ceti	18.4	31.1	43.7	56.8	9.1	21.3	34.8	1 16 56.46	.20	. .	.99	1 16 23.67	7.97	
22	42	ψ³ Aquarii	55.8	8.7	21.3	34.0	46.6	59.0	12.2	23 11 33.94	.20	. .	33.48	23 11 0.66	8.70	A.
	43	γ Pegasi	42.7	56.2	10.0	23.3	36.8	50.0	3.6	23 26 23.23	.13	. .	.49	23 25 49.87	7.89	
	44	ι Piscium	1.2	14.1	26.5	39.2	51.8	3.9	16.8	23 32 39.07	.17	. .	.50	23 32 5.74	8.46	
	45	λ Piscium	11.1	23.3	36.1	48.9	1.0	13.2	26.1	23 34 48.53	.18	. .	.50	23 34 15.21	8.33	
	46	Piscium, (8262)	31.0	43.8	56.2	8.9	21.2	33.3	46.4	23 39 8.70	+ 0 0.18	. .	.50	23 38 35.38	8.31	
	47	η Andromedæ	..	10.5	24.2	37.8	..	4.6	18.6	0 49 43.14	— 0 5.32	. .	.55	0 49 4.27	8.21	
	48	Piscium, (328).	26.6	39.3	52.0	4.6	16.3	29.1	42.2	1 1 4.30	+ 0 0.17	. .	.56	1 0 30.91	7.13	
	49	ϑ¹ Ceti	19.2	31.7	44.5	57.1	10.3	22.1	35.1	1 16 57.14	.20	. .	.57	1 16 23.77	7.97	
23	50	Sun, 1st L.	9.3	22.3	35.0	47.9	0.8	13.2	26.5	13 50 47.86	.20	. .	34.11	13 51 19.86	. .	K.
	51	Sun, 2d L.	21.1	34.1	47.0	59.8	12.5	25.1	38.2	13 52 59.69	+ 0 0.20					
	52	α Piscis Aust.	..	..	..	46.2	0.3	14.6	29.6	22 50 7.67	— 0 21.55	. .	— 34.44	22 49 11.68	+ 9.52	

25. +0s.36 applied to correction for clock error. Obs. on mic. wire No. 9.
Oct. 21. Stars exceedingly unsteady.

DATE.	VALUE OF m.	n.	c.	CLOCK. At 21h.	H. Rate. 0s.
	s.	s.	s.	s.	s.
Oct. 17	+0.265	—0.106	—0.086	f 30.05	g .017
" 19	.265	.106	.086	31.25	.037
" 20	.265	.106	.086	31.78	.028
" 21	.265	.106	.086	32.82	.039
" 22	.265	.106	.086	33.40	.039
" 23	+0.265	—0.106	—0.086	34.38	g .037

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to **1850.0**	
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	S.	S.	H. M. S.	S.	
Nov. 9	1	γ Cephei	8.5	3.0	59.0	53.5	47.1	41.0	37.0	23 33 52.73	— 0 0.15	. .	— 39.29	23 33 13.29	+ 1.66	K
	2	α Andromedæ	27.2	41.3	56.0	9.9	24.3	37.8	52.7	0 1 9.89	.09	. .	.31	0 0 30.49	8.03	
	3	γ Pegasi	23.2	36.4	49.5	2.5	15.4	27.7	41.0	0 6 2.24	.09	. .	.31	0 5 22.84	8.24	
10	4	Sun, 1st L.	48.2	1.5	14.9	28.0	41.0	53.9	7.5	15 1 27.86	.07	. .	.42	15 1 56.40	. .	A
	5	Sun, 2d L.	4.2	17.5	30.9	44.2	57.2	10.1	23.4	15 3 43.93	— 0 0.07					
	6	Aquarii, (7648)	10.4	23.3	36.4	49.0	..	..	..	21 50 29.78	+ 0 19.20	. .	.73	21 50 9.25	9.69	
	7	Neptune	21.3	34.5	47.4	0.4	13.2	25.7	38.6	21 52 0.16	— 0 0.07	. .	.74	21 51 20.41	. .	
	8	Bessel, 189, —13° 35′	..	..	..	..	2.3	15.0	28.0	21 53 15.10	25.77	. .	.74	21 52 9.59	9.57	
	9	α Aquarii	57.7	10.4	23.0	35.7	48.0	0.0	12.9	21 58 35.39	0.10	. .	.74	21 57 55.55	9.08	
	10	α Lacertæ	11.8	28.0	..	..	14.9	29.9	45.9	22 10 2.10	3.16	. .	.75	22 9 19.19	7.13	
	11	γ Aquarii	47.5	0.3	12.9	25.4	38.0	50.0	2.9	22 14 25.29	0.10	. .	.75	22 13 45.44	9.22	
	12	Lacertæ, (7880)	56.8	13.0	29.2	45.3	1.2	16.9	33.0	22 29 45.06	.09	. .	.76	22 29 5.21	7.91	
	13	ζ Pegasi	52.0	5.0	17.9	30.5	43.1	55.4	8.1	22 34 30.29	.09	. .	.77	22 33 50.43	8.49	
	14	α Pegasi	10.2	23.2	36.4	49.2	2.0	14.8	27.9	22 57 49.10	.09	. .	.79	22 57 9.22	8.29	
	15	ι Piscium	7.9	20.7	33.2	45.8	58.1	10.4	23.2	23 32 45.61	.10	. .	.81	23 32 5.70	8.61	
16	16	Sun, 1st L.	26.4	..	53.3	6.8	19.9	32.7	46.3	15 26 10.90	4.48	. .	46.36	15 26 28.66	. .	K
	17	Sun, 2d L.	43.7	57.1	10.7	24.1	37.1	49.8	3.4	15 28 23.70	0.07					
	18	ε Pegasi	48.8	1.7	14.5	27.2	39.8	52.0	5.0	21 37 27.00	— 0 0.09	. .	.59	21 36 40.32	8.81	
	19	Saturn	12.9	26.1	39.2	..	..	..	..	21 49 26.07	+ 0 25.72	. .	.60	21 49 5.19	. .	
	20	Aquarii, (7648)	17.0	30.3	43.2	55.8	8.6	21.3	34.4	21 50 55.80	— 0 0.07	. .	.60	21 50 9.13	9.77	
	21	Neptune	..	47.0	59.0	12.6	25.4	38.2	51.0	21 52 18.86	6.52	. .	.60	21 51 25.75	. .	
	22	ζ Pegasi	58.8	11.6	24.7	37.1	49.8	2.3	15.2	22 34 37.07	0.09	. .	.63	22 33 50.35	8.58	
	23	α Piscis Aust.	14.6	29.2	43.7	58.2	12.7	26.7	41.7	22 49 58.11	.06	. .	.64	22 49 11.41	9.88	
	24	γ Cephei	..	9.0	4.2	59.0	53.5	47.0	43.0	23 34 25.95	0 27.63	. .	.67	23 33 11.65	+ 2.15	
	25	Polaris	..	..	5.5	4.5	..	39.5	..	1 8 36.50	2 42.17	. .	.72	1 5 7.61	— 6.49	
	26	η Tauri	..	..	59.0	..	26.2	39.3	53.3	3 39 29.45	0 17.17	. .	.82	3 38 25.46	+ 9.03	
17	27	Sun, 1st L.	35.3	48.8	2.0	15.5	28.5	41.3	55.0	15 30 15.20	0.07	. .	.91	15 30 37.14	. .	A
	28	Sun, 2d L.	53.2	6.3	20.2	33.0	56.4	59.2	13.0	15 32 33.04	.07					
20	29	α Piscis Aust.	..	..	47.6	2.1	16.3	30.6	45.5	22 50 16.42	15.59	. .	50.37	22 49 10.46	9.95	K
	30	α Pegasi	20.6	33.7	46.8	59.7	12.5	24.9	38.4	22 57 59.51	0.09	. .	.38	22 57 9.04	8.38	
	31	ι Piscium	18.3	31.1	43.6	56.4	8.7	21.0	34.0	23 32 56.16	— 0 0.09	. .	.40	23 32 5.67	8.72	
	32	Comet Star, —0° 27′	29.5	42.0	54.8	7.3	..	..	44.8	23 54 59.68	+ 0 7.38	. .	.42	23 54 16.64	8.53	
	33	α Andromedæ	38.1	52.5	6.9	21.1	35.0	49.1	3.5	0 1 20.89	— 0 0.09	. .	.43	0 0 30.37	8.14	
	34	γ Pegasi	34.2	47.2	0.3	13.3	26.0	39.0	52.0	0 6 13.14	.09	. .	.43	0 5 22.62	8.34	
23	35	Aquarii, (7648)	24.3	37.4	50.4	3.3	16.2	28.7	41.8	21 51 3.16	— 0 0.07	. .	54.01	21 50 9.08	9.88	
	36	Neptune	53.2	6.7	19.8	32.6	..	..	..	21 52 13.07	+ 0 19.21	. .	.01	21 51 38.27	. .	
	37	α Piscis Aust.	21.5	36.2	50.8	5.4	19.8	..	..	23 49 50.74	24.31	. .	.04	22 49 21.01	9.99	
	38	γ Cephei	19.2	15.1	10.3	4.9	0.0	52.3	..	23 33 36.97	27.21	. .	.06	23 33 10.12	2.67	
	39	Comet Star, —0° 27′	32.9	45.6	58.3	10.7	23.2	..	..	23 54 58.14	+ 0 12.37	. .	.07	23 54 16.44	8.55	
	40	Comet Star, —0 23	..	..	..	..	..	..	53.1	23 55 53.10	— 0 37.64	. .	.07	23 54 21.39	8.56	
	41	α Andromedæ	41.6	56.0	10.4	24.7	38.7	52.5	6.9	0 1 24.40	.09	. .	.08	0 0 30.23	8.18	
	42	γ Pegasi	37.9	50.8	3.7	16.8	29.5	42.3	55.3	0 6 16.61	.09	. .	.08	0 5 22.44	8.37	
	43	Bessel, 136, —1° 21′	32.7	45.2	47.8	10.3	22.8	35.1	47.7	0 31 10.23	.10	. .	.09	0 30 16.04	8.34	
	44	η Tauri	38.8	52.6	6.3	20.2	33.4	46.8	0.9	3 39 19.86	.09	. .	.18	3 38 25.59	8.96	
	45	γ^1 Eridani	10.5	23.7	36.7	49.6	2.4	14.8	28.1	3 51 49.40	.07	. .	.19	3 50 55.14	6.91	
30	46	Sun, 1st L.	46.0	49.8	13.5	26.8	40.2	53.4	7.0	16 25 26.67	.06	. .	58.77	16 25 37.90	. .	
	47	Sun, 2d L.	6.2	20.0	33.3	46.8	0.3	13.5	27.4	16 27 46.79	.06					
	48	γ Cephei	..	..	..	..	..	57.0	53.0	23 36 25.00	2 16.85	. .	.87	23 33 9.28	3.22	
	49	Comet Star, —0° 27′	37.8	..	..	15.7	..	40.2	53.0	23 55 21.67	6.34	. .	.88	23 54 16.45	8.64	
	50	Comet Star, —0 23	..	55.7	..	..	..	..	58.2	23 55 26.95	— 0 6.39	. .	.88	23 54 21.68	8.63	
	51	Bessel, 136, —0 52	40.3	53.0	..	18.0	30.2	..	55.7	0 0 15.44	+ 0 2.40	. .	.88	23 59 18.96	8.61	
	52	α Andromedæ	..	..	..	29.6	43.6	57.3	11.7	0 1 50.55	— 0 21.40	. .	— 58.88	0 0 30.27	+ 8.27	

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	*n.*	*c.*	At 21*h.*	0*s.*
	s.	s.	s.	s.	
Nov. 9	—0.020	+0.056	—0.086	*f* 39.21	*g* .037
" 10	.020	.056	.086	39.73	.046
" 16	.020	.056	.086	46.59	.038
" 20	.020	.056	.086	50.29	.049
" 23	.020	.056	.086	53.98	.029
" 30	—0.020	+0.056	—0.086	58.83	*g* .015

TE. 16.	No. for ref.		OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
				I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
				s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	S.	S.	H. M. S.	S.	
. 30	1	γ	Pegasi	..	55.6	8.8	21.7	34.6	47.1	0.5	0 6 28.05	— 0 6.57	. .	— 58.88	0 5 22.60	+ 8.45	K.
	2		Bessel, 136, —0° 52′ .	..	..	..	1.1	13.3	25.5	38.2	0 15 19.52	18.89	. .	.88	0 14 1.75	8.53	
	3		Bessel, 136, —1 10 .	..	..	48.2	0.0	12.8	25.3	38.1	0 23 12.88	12.64	. .	.89	0 22 1.35	8.49	
	4		Bessel, 136, —1 18 .	..	34.5	47.0	59.6	12.2	24.0	36.8	0 26 5.68	6.38	. .	.89	0 25 0.41	8.47	
.	5		Bessel, 136, —1 21 .	37.3	50.3	2.6	15.5	27.8	39.8	52.7	0 31 15.14	0.10	. .	.89	0 30 16.15	8.44	
	6		Bessel, 136, —2 48 .	49.4	2.0	14.6	27.3	39.7	51.8	4.6	1 4 27.06	.10	. .	.90	1 3 28.06	7.95	
	7		Bessel, 136, —2 48 .	23.4	..	48.7	1.1	13.6	..	..	1 14 51.70	.27	. .	.90	1 13 52.53	7.98	
	8		Bessel, 136, —2 42 .	..	..	..	23.7	36.2	48.3	1.0	1 15 42.30	18.89	. .	.90	1 14 24.51	7.98	
	9		Moon, 1st L.	36.6	50.1	3.4	16.7	29.8	42.7	56.2	2 56 16.50	0.09	+ 68.20	.92	2 56 25.69	. .	
3	10		Aquarii, (7648) . .	30.1	43.2	56.3	8.9	21.7	34.5	47.7	21 51 8.91	.07	. .	59.92	21 50 8.92	10.02	
	11		Neptune	28.2	41.4	54.3	7.2	20.1	32.5	45.5	21 53 7.03	.07	. .	.92	21 52 7.04	. .	
	12	ζ	Pegasi	..	..	37.7	50.2	2.9	15.2	28.3	22 35 2.86	12.83	. .	.93	22 33 50.10	8.80	
	13	α	Pegasi	30.1	43.2	56.2	9.2	22.2	34.5	47.8	22 58 9.03	0.09	. .	.94	22 57 9.00	8.60	
	14	ι	Piscium	27.7	40.4	53.1	5.6	18.1	30.0	43.2	23 33 5.44	.10	. .	.95	23 32 5.39	8.88	
	15	γ	Cephei	..	..	..	..	6.1	58.9	54.8	23 35 59.93	1 49.45	. .	.95	23 33 10.53	3.48	
	16		Comet Star, —0° 32′ .	..	..	..	19.2	31.3	43.7	56.6	0 0 37.65	18.88	. .	.96	23 59 18.81	8.64	
	17	α	Andromedæ	..	..	..	30.6	44.6	58.2	13.0	0 1 51.60	21.40	. .	.96	0 0 30.24	8.31	
	18	γ	Pegasi	..	..	..	22.8	35.6	48.0	1.3	0 6 41.92	19.46	. .	.96	0 5 22.50	8.48	
4	19		Aquarii, (7648) . .	30.7	43.8	56.4	9.6	22.2	34.8	48.1	21 51 9.39	0.07	. .	61.38	21 50 7.94	10.08	
	20		Neptune	32.2	45.2	58.2	11.1	23.8	36.6	49.7	21 53 10.97	.07	. .	.38	21 52 9.52	. .	
9†	21	α	Arietis	..	..	..	..	..	..	18.3	1 59 18.30	40.77	. .	2.46	1 58 35.07	8.65	
	22	γ	Ceti	49.3	1.8	14.5	27.2	39.4	51.8	4.7	2 35 26.97	.10	. .	.47	2 35 24.40	8.04	
	23	α	Ceti	..	..	..	21.7	33.9	46.5	59.4	2 54 40.37	18.91	. .	.47	2 54 18.99	8.00	
	24	η	Tauri	..	1.3	15.0	28.8	42.4	55.8	9.6	3 38 35.48	6.95	. .	.48	3 38 26.05	8.88	
	25		Jupiter, 1st L. . .	25.6	..	52.8	..	19.7	..	46.4	4 37 6.12	0.08	. .	.49	4 37 5.34	. .	
	26		Jupiter, 2d L. . . .	..	42.8	..	10.0	..	36.4	..	4 37 9.73	.10					
14	27	ι	Piscium	..	..	..	..	..	34.7	47.3	23 32 41.00	31.43	. .	4.46	23 32 5.11	9.01	
	28	α	Andromedæ	52.0	6.2	20.7	34.8	48.8	3.0	17.2	0 0 34.69	0.09	. .	.47	0 0 30.13	8.46	
	29	γ	Pegasi	..	..	..	27.1	39.9	52.5	5.6	0 5 46.27	19.46	. .	.48	0 5 22.33	8.59	
	30		Bessel, 136, —0° 52′ .	..	..	..	..	18.4	30.7	43.5	0 14 30.87	25.10	. .	.48	0 14 1.29	8.69	
	31		Bessel, 136, —1 10 .	..	..	..	5.8	18.3	30.7	43.3	0 22 24.52	18.88	. .	.48	0 22 1.16	8.64	
	32		Anonymous, —1 12 .	..	..	..	45.7	58.8	11.0	24.1	0 23 6.90	18.88	. .	.48	0 22 43.54	8.64	
	33		Bessel, 136, —1 18 .	..	..	..	4.4	17.3	29.3	42.3	0 25 23.32	18.88	. .	.48	0 24 59.96	8.63	
	34		Bessel, 136, —1 21 .	..	..	34.3	46.8	59.4	11.7	24.4	0 27 59.36	12.64	. .	.48	0 27 42.24	8.61	
	35		Bessel, 136, —1 21 .	..	55.3	8.1	20.6	33.6	45.0	58.3	0 30 26.73	6.38	. .	.48	0 30 15.87	8.59	
	36		Bessel, 136, —1 41 .	..	..	..	..	..	14.3	27.3	0 39 20.80	31.35	. .	.49	0 38 44.96	8.54	
	37		Bessel, 136, —1 20 .	..	..	..	..	..	0.7	13.2	0 41 6.95	31.34	. .	.49	0 40 31.12	8.53	
	38		Bessel, 136, —1 22 .	..	..	..	32.7	44.8	57.2	9.8	0 43 51.12	— 0 18.88	. .	.49	0 43 27.75	8.51	
	39		Polaris	..	0.0	10.0	..	..	..	..	0 53 5.00	+11 53.33	. .	.49	1 4 53.84	. .	
	40	α	Ceti	..	..	10.7	23.2	35.8	48.0	0.8	2 54 35.70	— 0 12.66	. .	.53	2 54 18.51	8.02	
	41	η	Tauri	49.0	2.9	17.0	30.6	44.0	57.2	11.2	3 38 30.27	0.09	. .	.55	3 38 25.63	8.89	
	42		Jupiter, 1st L. . . .	38.7	..	5.8	..	32.7	..	59.8	4 34 19.25	.08	. .	.57	4 34 16.23	. .	
	43		Jupiter, 2d L. . . .	..	55.8	..	22.8	..	49.0	..	4 34 22.53	.10					
	44		Polaris, S. P. . . .	..	..	..	52.5	48.5	53.0	59.0	13 16 53.25	11 58.46	. .	.75	13 4 50.04	. .	
	45	α	Virginis	34.4	47.4	0.3	13.0	25.3	37.8	51.0	13 17 12.74	0.08	. .	.75	13 17 7.91	9.66	
18	46		Sun, 1st L. . . .	..	..	..	..	..	..	13.1	17 44 13.10	40.95	. .	6.00	17 44 37.21	. .	
	47		Sun, 2d L. . . .	13.2	26.9	40.7	54.6	8.2	21.3	35.4	17 45 54.33	0.06					
19	48		Comet Star, —0° 23′ .	45.8	58.4	11.0	23.7	35.9	48.2	0.9	23 54 23.41	.19	. .	7.00	23 54 16.22	8.86	
	49	α	Andromedæ	55.3	8.9	22.9	37.3	51.3	5.3	19.6	0 0 37.23	.06	. .	.00	0 0 30.17	8.56	
	50	γ	Pegasi	50.4	3.7	16.7	29.6	42.5	55.0	8.3	0 5 29.46	.12	. .	.01	0 5 22.33	8.67	
	51	δ	Andromedæ	34.0	48.4	3.4	17.7	32.2	46.2	1.2	0 31 17.58	— 0 0.05	. .	.02	0 31 10.51	+ 8.60	
	52		Polaris	48.0	54.0	..	53.0	51.0	..	50.0	1 3 15.20	+ 1 41.47	. .	— 7.04	1 4 49.63	— 5.40	

Dec. 9. At 0*h.* sideral time, found eye-tube much out of adjustment; adjusted it.
" 9. At 1*h.* 55*m.*, sideral time, set the minute-hand of clock back one minute.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	*n.*	*c.*	At 0*h.*	0*s.*
	s.	s.	s.	s.	
Nov. 30	—0.020	+0.056	—0.086	*f* 58.88	*g* .015
Dec. 3	.020	.056	.086	59.96	.019
" 4	.020	.056	.086	61.44	.019
" 9	.020	.056	.086	2.42	.014
" 14	.020	.056	.086	4.47	.021
" 19	—0.094	+0.236	—0.086	7.00	*g* .033

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.		TIMES OF TRANSIT OVER WIRES.								CORRECTIONS FOR			Observed R. Ascensions.	Reduction to 1850.0	Observers.
				I.	II.	III.	IV.	V.	VI.	VII.	Means.	Inst.	Semi-diam.	Clock.			
				s.	s.	s.	s.	s.	s.	s.	H. M. S.	M. S.	s.	s.	H. M. S.	s.	
Dec. 19	1	α	Arietis	..	14.4	28.7	..	..	..	..	1 58 21.55	+ 0 20.19	. .	— 7.07	1 58 34.67	+ 8.73	K
22	†2		Sun, 1st L. . . .	40.8	54.2	8.3	22.1	35.5	48.4	2.7	18 1 21.71	— 0 0.21	. .	9.18	18 2 23.51	. .	
	3		Sun, 2d L.	3.0	16.6	30.5	44.3	57.8	11.2	25.2	18 3 44.69	.21					
23	4		Sun, 2d L.	30.4	44.2	58.1	11.8	25.3	38.5	52.7	18 8 11.57	.21	— 61.21	.98	18 6 50.17	. .	
	5	γ	Pegasi	53.7	6.7	19.7	32.6	45.6	58.2	11.2	0 5 32.53	.12	. .	10.18	0 5 22.23	8.72	
	6	ϑ	Andromedæ . . .	..	..	..	..	..	49.1	5.2	0 9 57.15	39.56	. .	.18	0 9 7.41	8.46	
	7	α	Cassiopeiæ	56.1	18.6	41.0	3.2	25.2	47.0	9.8	0 32 2.99	+ 9 0.10	. .	.19	0 31 52.90	8.51	
	8	β	Ceti	25.4	38.0	52.2	5.5	18.2	31.4	44.7	0 36 5.17	— 0 0.10	. .	.19	0 35 54.88	+ 8.50	
	9		Polaris	46.0	57.0	56.0	..	..	..	..	0 48 53.00	+15 51.40	. .	.23	1 4 34.17	— 3.62	
	†10	α	Ceti	..	..	..	..	46.5	58.7	11.4	2 54 58.87	— 0 25.21	. .	.27	2 54 23.39	+ 8.05	
	11	ρ	Persei	..	..	..	..	51.2	7.2	23.2	2 56 7.20	31.84	. .	.27	2 55 25.09	9.48	
	12	α	Tauri	..	..	..	..	..	46.8	0.1	4 27 53.45	32.64	. .	.32	4 27 10.49	+ 8.53	
	†13		Jupiter, 1st L. . . .	0.4	..	29.8	..	56.3	..	23.3	4 29 42.45	0.08	. .	— 10.32	4 29 33.93	. .	
	†14		Jupiter, 2d L. . . .	..	19.3	..	46.4	..	13.0	..	4 29 46.28	— 0 0.10					

DATE.	VALUE OF			CLOCK.		H. Rate.	
	m.	*n.*	*c.*	At 0*h.*		0*s.*	
	s.	s.	s.		s.		
Dec. 19	—0.094	+0.236	—0.086	*f*	7.00	*g*	.033
" 23	—0.094	+0.236	—0.086		10.18	*g*	.033

10. This star differs 4s.88 from the Nautical Almanac; probably an error of 5s. in noting the transit.

13 & 14. Stars very unsteady.

OBSERVATIONS

WITH

THE MURAL CIRCLE,

1846.

NATIONAL OBSERVATORY.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMETERS			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	revs.	In.	°	°	°	°
Jan. 3	†1	Sun, S. L.	4	. . .	101 57 19.6	13.3	17.6	13.7	17.3	21.0	17.08	. .	29.844	46.5	46.3	45.5	47.0
	2	Moon, S. L.	4	. . .	74 41 44.5	39.7	45.6	40.0	46.3	48.0	44.02	. .					
	3	Uranus	4	. . .	76 56 40.0	34.0	39.4	33.3	40.5	42.0	38.20	. .	29.820	45.5	38.5		
	4	Mars	4	. . .	75 39 65.0	58.3	64.0	59.5	66.6	65.3	63.12	. .					
	5	Polaris	1	−28 43.2	350 24 23.6	17.0	24.3	17.5	23.7	24.2	21.72	. .	29.820	45.0	38.0	46.0	45.0
	†6		2	18 51.2	45.7	40.0	48.0	40.0	46.6	47.4	44.61	. .					
	†7		3	9 9.2	59.5	53.3	61.4	54.5	62.4	60.4	58.58	. .					
	†8		4	+ 0 34.8	65.0	59.4	66.3	60.7	68.7	65.5	64.27	. .		44.0	37.0		42.0
4	9	α Lyræ	4	. . .	40 14 53.5	50.0	54.3	51.4	55.0	55.0	53.20	. .	30.216	37.0	38.5	41.0	42.0
5	10	Sun, S. L.	4	. . .	101 44 27.7	25.0	26.2	24.4	25.0	25.4	25.62	. .	30.220	38.3	39.0		42.5
	†11	α Andromedæ	4	. . .	50 38 47.3	41.0	45.7	41.5	46.3	49.0	45.13	. .	30.248	43.0	39.5	42.0	44.5
	12	Uranus	4	. . .	76 55 45.0	39.4	46.0	41.5	47.0	47.0	44.32	. .					
	13	Mars, S. L.	4	. . .	75 7 61.5	56.6	61.6	58.4	63.3	62.0	60.57	. .			39.0		
	14	Mars, N. L. (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.135					
	15	Polaris,	2	−18 48.5	350 24 45.6	39.3	46.0	43.4	43.3	48.5	44.35	. .	30.250	43.0	38.3		43.0
	16		3	8 58.5	58.3	52.5	58.6	57.0	58.6	60.3	57.55	. .					
	17		4	+ 0 41.5	64.0	58.6	64.0	63.0	65.0	66.0	63.43	. .	30.260	43.0	37.8		42.5
	18		5	10 21.5	57.8	51.0	57.0	56.0	56.5	60.2	56.42	. .					
	19		6	20 2.5	42.3	34.6	41.6	39.3	37.3	45.2	40.05	. .					
	†20		7	30 0.5	16.5	8.6	14.4	13.0	13.5	19.0	14.17	. .		42.0	36.7		
	21	Jupiter, S. L.	4	. . .	68 9 15.0	11.0	13.3	12.5	13.7	19.0	14.08	. .	30.266	41.2	34.7		41.0
	†22	Jupiter, N. L. (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.623					
	23	γ Ceti	4	. . .	76 17 46.4	43.0	46.7	46.2	46.7	49.8	46.47d	. .	30.274	40.0	31.5		39.5
	24	α Ceti	4	. . .	75 23 56.2	52.5	56.0	57.0	56.7	59.8	56.37	. .	30.280	39.5	33.0		
	25	α Persei	4	. . .	29 35 7.0	2.3	4.2	6.0	8.3	10.5	6.38	. .	30.282	39.0	31.7		
	26	η Tauri	4	. . .	55 15 47.5	44.0	46.0	47.3	47.2	51.3	47.22	. .	30.270	38.0	30.8		36.5
	27	γ^1 Eridani	4	. . .	92 49 21.0	19.0	18.0	21.0	19.0	23.0	20.17	. .					
	†28	α Tauri	4	. . .	62 41 29.7	25.0	25.5	27.3	26.3	33.0	27.80	. .	30.286	37.0	29.0		35.5
	†29	α Aurigæ	4	. . .	33 3 36.5	33.8	33.5	35.0	34.0	39.0	35.30	. .	30.300	35.6	28.8		34.5
	30	β Tauri	4	. . .	50 25 8.4	4.7	6.3	6.6	9.4	11.0	7.73	. .					
	31	δ Orionis	4	. . .	79 17 53.0	53.5	54.0	53.6	54.8	56.3	54.20	. .					
	32	α Columbæ	4	. . .	112 59 60.6	59.0	60.0	61.2	61.6	63.0	60.90	. .	30.290	35.3	28.5		
	33	α Orionis	4	. . .	71 30 38.5	36.3	37.3	37.0	36.6	42.0	37.95	. .		35.0	27.8	41.0	34.5
8	34	Sun, S. L.	4	. . .	61 21 61.4	51.0	57.8	52.9	58.6	62.0	57.28	. .	29.982	45.7	46.5	43.2	47.5
	35	Venus, S. L.	4	. . .	48 51 51.9	41.0	47.9	45.0	47.0	55.0	47.97	. .	29.958	46.2	44.5	43.7	46.2
	†36	Venus, N. Cusp. (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.459					
	37	Mars, S. L.	4	. . .	34 19 63.1	53.5	59.4	55.1	60.0	64.6	59.28	. .	29.972	44.8	39.7		43.2
	38	Mars, N. L. (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.128					
	39	Polaris, (Mic.)	4	− 0 40.6	310 24 58.8	48.6	55.0	49.0	54.1	59.6	54.18	29.820					
	40			0 3.6								.808					
	41			+ 0 22.4								.818					
	42			0 49.4								.808					
	43			1 19.4								.810					
	†44			1 49.4								.808					
	45			2 19.4								.812					
	46			2 57.4								.809					
	47			3 19.4								.815					
	48			3 49.4								.816					
	49			4 19.4								.822					
	50			4 49.4	57.9	48.4	55.2	48.1	53.9	59.4	53.82	.830	29.978	44.0	39.7	43.8	42.6
	51	Jupiter, N. L.	4	. . .	28 5 9.4	2.1	9.3	2.0	11.4	9.6	7.30	. .	29.984	43.5	38.6		41.6
	52	Jupiter, S. L. (Mic.)	4	. . .	" " "	"	"	"	"	"	"	29.314					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Jan. 5, 19*h*.	29.968	62.83	Mars	13	0 5.02
" 8, 2*h*.	29.969		Jupiter	21	0 20.55
			Venus	35	0 15.73
			Mars	37	0 4.97
			Jupiter	51	0 20.67

Jan. 7. Placed telescope at 180°; adjusted level, collimation and horizontal wire.

Jan. 8. After Polaris, moved circle eastward in azimuth.

Jan. 3. Error of Runs + 0″06 Temp. of circle, and stone 40°

Jan. 5. do. do. .25 do. do. do. 40°

Jan. 8. do. do. .02 do. do. do. 40°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		39° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.07	—14 35.75	101 42 41.26	.54.44	— 22 49 7.57		P.
0.02	—47 54.80	73 53 49.20	54.23	+ 4 59 44.28		
-0 0.02	+ 0 44.29	76 57 22.47		+ 1 56 11.01		
. . .	+ 0 38.34	75 40 41.46		+ 3 12 52.02		
-0 41.90	— 1 9.57	350 23 54.05		+ 88 29 39.79	+53.87	
17.95	.60	52.96				
4.19	.64	53.13				
0.02	— 1 9.68	54.61				
. . .	+ 0 0.25	40 14 53.45	55.83	+ 38 38 41.63	7.42	
0.04	—14 33.63	101 29 52.03		— 22 36 16.95		
+0 0.11	+ 0 11.28	50 38 56.52	54.37	+ 28 14 37.10	66.92	
-0 0.05	0 44.86	76 56 29.13		+ 1 57 4.49		
+0 0.18	+ 0 38.19	75 8 33.92		+ 3 44 59.70		
-0 9.87	.19					
+0 17.86	— 1 10.52	350 23 51.69	53.15	+ 88 29 41.11	53.81	
3.96	.56	50.95				
0.02	.60	52.85				
5.72	.66	51.48				
21.10	.72	50.43				
46.98	— 1 10.81	50.34				
+0 0.03	+ 0 31.55	68 9 25.10	52.92	+ 10 44 7.07		
-0 41.06	.53					
+0 0.05	0 44.80	76 18 31.32		+ 2 35 0.85	63.52	
0.03	+ 0 43.23	75 24 39.63		+ 3 28 52.54	59.89	
. . .	— 0 11.22	29 34 55.16		+ 49 18 37.01	40.63	
. . .	+ 0 16.68	55 16 3.90		+ 23 37 28.27	44.84	
0.01	1 20.45	92 50 40 63		— 13 57 8.46	51.35	
+0 0.04	+ 0 25.67	63 41 53.51		+ 16 11 38.66	34.09	
-0 0.02	— 0 7.49	33 3 27.79		+ 45 50 4.38	17.66	
. . .	+ 0 11.30	50 25 19.03		+ 28 28 13.14	18.16	
. . .	0 50.27	79 18 44.47		— 0 25 12.30	20.82	
. . .	3 18.73	113 3 19.63		— 34 9 47.46	21.43	
+0 0.01	+ 0 37.72	71 31 15.68	359° 59′	+ 7 22 16.49	12.82	
-0 0.11	—14 37.77	61 7 19.40	56″.54	— 22 13 43.61		C.
0.04	+ 0 55.28	48 52 27.48		— 9 58 51.69		
30.64	0 54.41					
0.01	+ 0 36.69	34 20 30.99	56.63	+ 4 33 4.86		
-0 9.95	.69					
+0 9.41	— 1 9.68	310 23 53.73	56.73	+ 88 29 41.61	+53.69	
10.13	.68	54.46				
9.51	.68	53.83				
10.16	.68	54.48				
10.07	.68	54.39				
10.27	.68	54.60				
10.12	.68	54.44				
10.46	.68	54.78				
10.20	.68	54.52				
10.30	.68	54.62				
10.13	.68	54.45				
9.86	— 1 9.68	54.18				
. . .	+ 0 30.93	28 5 58.90		+ 10 47 37.07		
-0 41.34	.94					

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
January 3.		9h.					
219° 59′	58″5	48″6	54″5	49″0	54″2	61″5	54″38
	57.5	49.7	55.3	48.3	56.8	59.4	54.50
	58.3	48.2	54.5	48.3	54.6	60.7	54.10
P.	57.5	50.5	56.0	49.3	58.4	59.0	55.12
	58.5	48.2	54.5	48.6	54.8	60.7	54.22
	56.7	50.3	55.4	47.5	57.8	58.0	54.28
Means	57.83	49.25	55.03	48.50	56.10	59.88	54.433 + 4
January 3.		1h.,	30m.				
219 59	58.0	47.5	54.6	49.0	55.8	60.0	54.15
	57.3	48.8	55.3	48.3	57.8	58.0	54.25
P.	58.5	48.4	54.6	49.6	55.3	60.2	54.43
	56.7	48.7	55.2	48.6	56.6	58.7	54.08
Means	57.63	48.35	54.92	48.88	56.37	59.23	54.230
January 5.		20h.					
219 59	57.5	52.5	57.0	53.3	58.0	58.0	56.05
	57.5	53.0	57.0	52.7	58.8	57.6	56.10
	58.4	51.7	56.3	53.7	56.0	59.5	55.93
P.	57.0	53.0	57.0	53.0	58.6	57.8	56.07
	57.0	52.0	55.7	52.3	57.0	57.8	55.30
	57.0	52.3	56.5	52.4	57.8	57.4	55.57
Means	57.40	52.42	56.58	52.90	57.70	58.02	55.837 — 3
January 5.		4h.					
219 59	54.0	48.8	51.0	53.0	52.0	58.8	52.93
	53.3	49.3	52.0	51.7	55.0	56.4	52.95
	54.0	48.3	50.3	52.5	51.5	58.0	52.43
P.	53.7	50.2	52.0	52.0	55.2	56.6	53.28
	55.0	48.7	51.0	52.6	52.0	58.5	52.97
	53.0	49.8	52.0	52.0	54.5	56.5	52.97
Means	53.83	49.18	51.38	52.30	53.37	57.47	52.922 — 4
January 8.		22h.,	30m.				
179 59	59.7	53.0	58.6	53.0	58.9	61.1	57.38
	59.2	50.5	56.2	52.1	54.3	61.4	55.62
	60.1	51.6	57.6	52.9	55.9	62.4	56.75
C.	60.0	51.8	57.1	53.0	55.9	62.4	56.70
	60.2	51.5	57.6	53.1	55.5	62.3	56.70
	60.1	51.9	57.6	53.2	55.9	62.5	56.87
Means	59.88	51.72	57.45	52.88	56.07	62.02	56.670 —.130
January 8.		2h.,	15m.				
179 59	60.1	52.8	60.0	51.9	59.6	59.1	57.25
	59.5	52.2	60.0	51.2	58.8	59.3	56.83
	59.6	52.9	59.9	51.9	59.3	59.2	57.13
C.	59.4	51.8	59.2	51.5	59.0	59.1	56.67
	58.8	53.2	60.3	51.1	61.0	57.1	56.92
	60.0	51.2	58.2	51.3	57.6	59.6	56.32
Means	59.57	52.35	59.60	51.48	59.22	58.90	56.853 —.130

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
3, No. 1	45.5	47.0	45.0
" 2	46.0	43.0	43.0
5, " 1	41.0	44.0	40.5
" 2	41.0	40.0	37.5
8, " 1	43.7	46.2	44.6
" 2	44.0	42.5 42.9	42.9 43.4

1. Sun's limb badly defined.
6. Partially obscured.
7. Faint, but steady; after 8 stopped by clouds.
11 to 22. Zenith point doubtful.
20, 28, 29. Very unsteady.
36. Correction of N. cusp. for defective illumination—0″.84.
44. 16s. before passing middle wire.
Nadir point Jan. 8, No. 1, mercury unsteady.

DATE. 1846.	No. for ref.		OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMET			
								A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
				No.	M. S.	°	'	"	"	"	"	"	"	"	revs.	In.	°	°	°	°
Jan. 8	1		Vesta	5	+ 0 17.0	22	31	57.6	49.6	57.1	50.1	57.9	58.3	55.10	. .	29.992	42.0	35.0		40.
	2		Moon, N. L.	4	. . .	19	5	18.0	10.3	17.9	10.8	18.4	15.1	15.08	29.990	29.996	41.2	33.6	43.8	40.
10	3				− 2 7.4	310	24	65.6	59.0	68.7	56.0	69.0	65.2	63.92	29.971			32.1	42.0	39.
	4				1 37.4										.968					
	5				1 7.4										.958					
	6				0 37.4										.960					
	7				+ 0 2.6										.941					
	8		Polaris, (Mic.)	4	0 22.6										.953	29.842	39.2			
	9				0 52.6										.951					
	10				1 22.6										.961					
	11				1 52.6										.958					
	12				2 22.6										.952					
	13				2 52.6			65.9	59.2	68.1	55.9	68.4	65.1	63.77	.953			32.1		38.
	14		Jupiter, N. L.	4	. . .	28	2	27.5	22.9	30.7	20.0	29.3	27.8	26.37*d*	. .	29.832	38.5	29.8	42.0	39.
	15		Jupiter, S. L. (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	29.311					
	16	γ	Ceti	4	. . .	36	17	52.2	46.2	55.7	44.2	55.3	51.2	50.80*d*	. .	29.832	37.8	29.9		36
	17	β	Ursæ Minoris, S. P.	4	. . .	293	42	40.2	33.7	43.5	32.4	41.5	39.4	38.45*d*	. .			30.2		35
	18	α	Persei	4	. . .	349	35	10.8	3.8	14.9	2.9	13.0	8.2	8.93	. .	29.810	37.0	29.8		34
	†19	η	Tauri	4	. . .	15	15	50.8	47.2	54.6	42.8	55.7	49.2	50.05	. .	29.810	35.9	29.2	41.6	3
	20	γ^1	Eridani	4	. . .	52	49	26.6	23.6	30.2	21.0	28.0	27.6	26.17	. .	29.800	35.8	29.2		3
	21		Vesta	4	. . .	22	26	22.1	20.0	28.1	16.9	27.2	23.9	23.03	. .	29.792	35.0	29.2		3
	22	α	Tauri	4	. . .	22	41	32.5	28.1	36.3	26.8	35.0	32.6	31.88	. .	29.788	34.8	29.1		3
	23	ε	Ursæ Minoris, S. P.	4	. . .	301	11	60.2	57.6	65.0	55.1	67.0	59.2	60.68	. .			29.0		3
	24	β	Orionis, (Mic.)	4	. . .	17	15	52.6	49.1	57.0	46.0	58.6	52.0	52.55	30.126					
	25	β	Tauri, (Ref.)	4	. . .	169	34	41.6	39.8	48.5	38.6	46.0	42.0	42.75	. .	29.784	34.0	29.0		3
	26	ε	Orionis	4	. . .	40	11	11.3	7.8	15.2	7.8	16.4	13.0	11.92	. .			28.6		
	27	α	Columbæ	4	. . .	73	0	7.0	5.5	11.1	5.0	12.5	7.5	8.10	. .	29.742	34.9	28.6		3
	28	α	Orionis	4	. . .	31	30	42.0	38.5	46.0	36.1	46.2	42.2	41.83	. .	29.782	33.7	28.7		3
	†29		Moon, N. L. (Mic.)	3	− 0 12.3	19	29	64.1	60.2	68.1	59.4	69.1	61.3	63.70	30.162					3
	30		Moon, S. L.	5	+ 0 18.7	19	59	55.6	52.0	61.0	50.2	62.0	54.0	55.80	. .	29.778	33.0	27.8		3
	†31	α	Lyræ	4	. . .	0	14	59.7	50.8	60.5	49.8	61.7	58.0	56.75	. .	29.688	36.3	39.0	39.0	38.
11	32		Sun, S. L. (Mic.)	1	− 0 50.0	60	54	65.0	56.5	67.7	54.0	66.7	62.0	61.98	29.500	29.660	38.0	40.3		41.
	†33		Sun, N. L.	4	. . .	60	22	59.7	50.5	65.5	47.3	65.0	57.3	57.55*d*	. .					
12	34		Jupiter, S. L.	4	. . .	28	0	17.0	17.0	20.8	12.0	23.0	20.0	18.30	. .	29.900	40.0	32.5	40.0	37.5
	35		Jupiter, N. L. (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	30.728					
	36	α	Tauri	4	. . .	22	41	37.7	36.2	41.5	31.5	44.0	39.0	38.32	. .	29.946	36.0	26.5	40.0	36.5
	†37	α	Aurigæ	4	. . .	333	3	44.0	44.5	49.6	39.3	53.0	46.0	46.07	. .	29.950	35.0	27.0		34.0
	†38	β	Tauri	4	. . .	10	25	15.4	16.3	18.7	27.2	22.0	16.0	19.27	. .					
	†39	δ	Orionis	4	. . .	39	18	4.3	5.2	7.0	0.3	12.0	5.4	5.70	. .	29.954	35.0	28.0		
	†40	α	Orionis	4	. . .	31	30	45.3	46.0	50.3	42.3	55.0	47.3	47.70	. .	29.950	34.0	28.2		
	41	α	Lyræ	4	. . .	0	14	63.7	62.5	66.7	59.6	70.5	65.0	64.67	. .	30.244	36.5	32.3	39.0	37.
13	†42		Sun, S. L. (Mic.)	1	− 0 50.0	60	35	5.0	5.2	9.0	0.0	13.0	7.4	6.60	29.400	30.240	37.0	33.3		38.
	†43		Sun, N. L.	7	+ 0 50.0	60	3	13.5	12.3	15.4	8.2	18.3	15.6	13.88	. .					
	44	α	Cassiopeiæ	4	. . .	343	11	67.0	65.3	72.0	59.0	76.0	70.0	68.22	. .	30.240	37.5	31.2		
	45			2	−20 46.3	310	24	50.5	49.0	55.3	43.0	59.3	51.5	51.43	. .	30.236	37.0	30.0		36.
	46			3	10 56.3			64.3	64.7	70.0	57.4	74.6	65.2	66.03	. .					
	47			4	1 18.3		25	10.4	10.0	15.0	3.7	18.5	11.0	11.43	. .					
	48		Polaris	5	+ 8 25.7		"	8.0	7.4	12.0	1.5	16.2	9.0	9.02	. .					
	49			6	18 3.7		24	55.0	53.6	58.6	48.0	62.6	56.7	55.75	. .					
	50			7	27 51.7			32.8	31.0	36.7	25.6	37.4	35.0	33.08	. .			29.0		
	51		Jupiter, S. L.	5	. . .	27	58	40.0	42.3	45.4	36.4	49.6	42.3	42,67	. .	30.236	35.5	28.0		33.
	52		Jupiter, N. L. (Mic.)	5	. . .	"	"	"	"	"	"	"	"	"	30.707					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	"			' "
Jan. 10, 2*h*.	29.962	62.83	Jupiter	14	0 20.56
			Moon	29	14 49.14
" 11, 20*h*.	29.954		Sun	32	16 17.13
" 12, 2*h*.	30.067		Jupiter	34	0 20.76
" 13, 20*h*.	30.056		Sun	42	16 17.60
			Jupiter	51	0 20.45

Jan. 9. Corrected loss of motion in microscope F.
Jan. 10. Before Polaris, adjusted more nearly in azimuth.
After Nadir point No. 2 perfected adjustments in level and azimuth.
Jan. 12. Before observations, again adjusted in level and collimation: microscope F re-adjusted.

Jan. 10.	Error of Runs −0".65	Temp. of circle 36°,	of stone 42°
Jan. 11.	do. .35	do. 40°,	do. 40°
Jan. 12. } Jan. 13. }	do. .35	do. 35°,	do. 39°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.20	+ 0 23.08	22 32 18.38	56.72	+ 16 21 17.59		C.
-0 1.31	— 2 26.75	19 2 47.02		+ 19 50 48.95		
0.28	1 10.52	310 23 53.04	56.69	+ 88 29 42.15	+53.58	
-0 0.18	.52	53.14				
+0 0.32	.52	53.64				
0.16	.52	53.48				
1.33	.52	54.65				
0.59	.52	53.91				
0.74	.52	54.06				
0.16	.52	53.48				
0.42	.52	53.74				
0.90	.52	54.22				
0.96	— 1 10.52	54.28				
0.04	+ 0 31.29	28 3 18.26		+ 10 50 17.68		
41.14	.31					
0.10	+ 0 44.30	36 18 35.20		+ 2 35 0.74	+63.91	
0.07	— 2 16.50	293 40 22.02		+ 74 46 46.12	—41.18	
0.02	— 0 11.09	349 34 57.86	56.63	+ 49 18 38.02	+43.23	
+0 0.13	+ 0 16.48	15 16 6.66		+ 23 37 29.22	44.87	
—0 0.09	1 19.47	52 50 45.55		— 13 57 9.67	52.05	
+0 0.23	0 23.14	22 26 46.40		+ 16 26 49.48		
0.26	+ 0 25.24	22 41 57.38		+ 16 11 38.50	+34.25	
+0 0.33	— 1 39.40	301 10 21.61	56.58	+ 82 16 45.78	—14.26	
—0 10.09	+ 1 5.27	47 16 47.73		— 8 23 11.90	+28.38	
—0 0.04	— 0 11.11	169 34 31.60		+ 28 28 14.22	17.98	
+0 0.19	+ 0 50.93	40 12 3.04		— 1 18 27.21	20.35	
0.02	3 15.10	73 3 23.22		— 34 9 47.39	22.76	
+0 0.10	+ 0 37.03	31 31 18.96		+ 7 22 16.87	13.25	
—0 11.73	—17 32.40	19 27 8.71		+ 19 26 27.12		
0.75	—17 57.20					
—0 0.07	+ 0 0.25	0 14 56.93	56.63	+ 38 38 38.95	9.12	P.
+0 27.63	1 37.70	60 40 50.18		— 21 47 14.30		
0.06	1 35.44					
+0 0.01	0 31.14	28 0 28.69	63.02	+ 10 53 13.58		
—0 41.50	0 31.13					
+0 0.17	+ 0 25.51	22 42 4.00		+ 16 11 38.27	34.31	
—0 0.12	— 0 7.42	353 3 38.53		+ 45 50 3.74	16.79	
+0 0.03	+ 0 11.20	10 25 30.50		+ 28 28 11.77	17.91	
—0 0.19	0 49.77	39 18 55.28		— 0 25 13.01	21.67	
+0 0.08	+ 0 37.27	31 31 25.05		+ 7 22 17.25	13.41	
—0 0.07	0 0.27	0 15 4.87	62.93	+ 38 38 37.31	9.77	
+0 40.50	1 39.84	60 21 9.34		— 21 27 27.15		
0.29	+ 1 37.57					
0.16	— 0 18.42	343 11 49.96	62.75	+ 55 41 52.04	60.17	
22.12	1 11.72	310 23 61.83		+ 88 29 41.16	+53.46	
6.17	.74	60.46				
0.10	.77	59.76				
3.67	.80	60.89				
16.82	.84	60.73				
—0 40.20	— 1 11.88	61.40				
-0 0.09	+ 0 31.77	27 58 53.90	62.56	+ 10 54 47.91		
-0 40.98	+ 0 31.76					

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
January 10.		1h.,	40m.				
179° 59′	58″5	51″6	61″0	50″1	59″7	58″1	56″50
	57.7	52.5	61.7	50.4	61.4	58.0	56.95
	58.0	52.9	61.8	50.2	61.4	57.5	56.97
C.	58.0	52.9	61.6	50.3	61.8	58.0	57.10
2h., 20m.	56.1	54.5	62.9	49.4	64.3	55.6	57.13
	57.1	54.0	62.0	49.9	63.3	56.8	57.18
	56.7	53.2	62.0	49.6	62.0	56.4	56.65
	56.6	52.5	61.1	49.1	61.8	55.8	56.15
Means	57.34	53.01	61.76	49.88	61.96	57.02	56.829 —.138
January 10.		6h.,	30m.				
179 59	54.8	55.8	62.6	50.1	63.0	54.5	56.80
	55.1	54.5	61.8	51.0	61.6	55.3	56.55
	55.3	55.2	62.1	51.9	62.3	55.0	56.97
C.	55.1	54.9	61.5	51.6	61.8	55.2	56.68
	55.2	54.9	61.2	51.4	61.0	55.1	56.47
	55.4	55.0	61.5	51.9	61.7	55.6	56.85
Means	55.15	55.05	61.78	51.32	61.90	55.12	56.720 —.140
January 10.		19h.					
179 59	59.3	52.2	63.0	49.8	59.7	57.8	56.97
	58.0	53.5	63.6	48.6	61.6	56.0	56.88
	59.3	53.0	62.6	49.4	60.0	57.0	56.88
P.	59.3	53.4	63.7	49.5	61.3	57.3	57.42
	58.6	52.5	62.6	48.8	59.8	57.5	56.63
	57.0	52.5	62.6	47.5	59.8	55.5	55.82
Means	58.58	52.85	63.02	48.93	60.37	56.85	56.767 —.138
January 12.		4h.					
179 59	62.3	62.0	65.3	59.8	68.0	65.6	63.83
	61.3	62.0	65.3	59.0	68.4	64.0	63.33
	60.4	61.3	64.6	58.3	67.7	62.8	62.52
P.	60.6	62.4	65.0	59.0	68.3	63.0	63.05
	60.6	62.4	65.0	59.0	68.3	63.0	63.05
	60.6	62.4	65.0	59.0	68.7	63.0	63.12
Means	60.97	62.08	65.03	59.02	68.23	63.57	63.150 —.130
January 13.		20h.					
179 59	61.0	61.0	65.0	57.0	67.3	64.0	62.55
	60.4	63.0	67.0	56.6	70.8	62.5	63.38
	61.0	61.5	65.8	56.6	68.6	63.8	62.88
P.	60.3	63.0	66.6	56.6	70.6	62.5	63.27
	60.6	62.3	66.0	56.6	69.2	63.8	63.08
	60.6	62.3	66.4	56.6	69.5	63.8	63.20
Means	60.65	62.18	66.13	56.67	69.33	63.40	63.061 —.130

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
10, No. 1	42°0	38°5	38°5
	. .	39.5	39.2
	. .	38.5	38.8
" 2	41.6	33.0	35.0
	. .	34.8	35.8
" 3	39.0	39.7	38.5
12, " 1	40.0	36.0	35.5
	. .	39.0	37.0
13, " 1	39.0	38.0	38.5
	. .	40.5	. .

19. Tauri 1164, is N. of η Tauri, 39″.40.
29. Cor. for defective illumination —1″.36.
31. Very unsteady; much parallax to E. and F.
33. Cor. for divisions +0″.04.
37. Passing clouds.
38. Seen only on the 4th wire; indistinctly.
39. Through clouds.
40. Stopped by clouds.
42. Cor. for divisions +0″.14.
43. " " —0″.13.
Nadir Point, No. 3, Jan. 10, much parallax.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMET			
							A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
			No.	M. S.	°	'	"	"	"	"	"	"	"	Revs.	In.	°	°	°	
Jan. 13	1	γ Ceti, (Ref.)	5	. . .	143	42	5.0	6.1	9.1	2.3	13.8	7.8	7.36*d*	. .		34.5	27.5		
	†2	α Ceti, (Ref.)	4	. . .	144	35	56.0	58.3	60.6	54.5	63.6	59.8	58.80	. .	30.240	33.8	24.7		
	†3	α Persei, (Ref.)	4	. . .	190	24	51.3	51.3	56.3	47.5	57.0	53.5	52.82	. .		33.5	25.0		
	4	η Tauri	4	. . .	15	15	54.5	55.5	58.0	49.7	62.0	55.0	55.78	. .	30.290	33.0	24.0		
	5	γ¹ Eridani	4	. . .	52	49	29.6	30.3	32.4	26.7	34.2	32.6	30.97	. .	30.232	32.5	24.7		31.
	6	Vesta	4	. . .	22	17	36.0	38.1	41.3	33.3	43.6	39.2	38.57*d*	. .		32.0	23.7		
	†7	α Tauri	4	. . .	22	41	35.0	37.5	39.5	31.8	43.3	38.7	37.63	. .	30.240	32.0	22.5		33.
	8	α Aurigæ	4	. . .	353	3	42.5	44.5	48.3	40.3	51.6	46.3	45.58	. .	30.236	31.5	21.5		30.
	9	β Tauri	4	. . .	10	25	15.4	17.4	20.0	14.7	22.7	16.6	17.80	. .		31.0	22.6		
	10	δ Orionis	4	. . .	39	17	62.4	64.6	65.3	59.7	69.5	64.8	64.38	. .					
	11	α Columbæ	4	. . .	73	0	6.5	9.2	11.6	6.3	15.0	8.0	9.43	. .		30.5	22.8		29.
	12	α Orionis	4	. . .	31	30	43.5	46.4	50.0	42.4	55.3	46.4	47.33	. .	30.232	29.7	22.5	39.0	28.
	13	α Lyræ	4	. . .	0	14	59.8	62.2	66.0	57.8	71.0	60.0	62.80	. .	30.152	35.7	36.5	36.2	36.
14	14	Sun, N. L. (Mic.)	3	− 0 16.0	59	52	48.5	49.2	54.0	43.5	59.0	52.1	51.05*d*	30.148					37.
	†15	Sun, S. L.	4	+ 0 4.0	60	25	19.1	19.8	24.2	14.9	26.4	23.1	21.25	. .	30.114	37.0	39.0		39.
	16		3	− 9 30.0	310	25	4.0	2.5	1.9	0.4	8.9	9.9	4.60	. .			37.4		40.
	17			2 3.0										29.978					
	18			1 33.0										.979					
	19			1 3.0										.983					
	20			0 33.0										.981					
	21	Polaris, (Mic.)	4	− 0 3.0			8.4	7.5	7.3	6.7	12.9	15.0	9.63	. .					
	22			+ 4 57.0										30.065					
	23			5 27.0										.074					
	24			5 57.0										.078					
	25			6 27.0										.080					
	26			6 57.0										.082					
	27		5	+ 9 38.0			4.4	3.3	3.1	1.9	8.9	11.0	5.43	. .	30.090	41.0	37.2		41.
	†28	α Orionis	4	. . .	31	30	46.8	48.0	47.1	47.9	53.4	54.6	49.63	. .	30.120	36.7	28.0	37.5	35.
	29	μ Geminorum	4	. . .	16	18	19.3	20.0	19.0	17.0	23.0	25.4	20.62	. .	30.124	36.2	29.2		35.
	30		3	− 5 21.0	311	39	16.5	16.1	16.0	16.0	20.1	24.0	18.12	. .	30.120	36.0	29.5		34.
	31	51 (Hev.) Cephei	4	− 0 3.0			18.9	19.4	18.9	18.3	22.6	26.1	20.70	. .					
	32		5	+ 5 21.0			16.0	16.0	15.9	15.1	19.2	23.0	17.53	. .	30.124	35.5	29.4		35.
	†33	α Canis Majoris	4	. . .	55	22	51.3	53.0	52.9	54.7	58.8	58.5	54.87*d*	29.961	30.125	35.5	29.6		35.
	34	ε Canis Majoris	4	. . .	67	37	23.2	24.7	23.7	25.1	27.1	32.3	26.02*d*	. .	30.126	35.2	29.6		35.
	35	α Canis Minoris	4	. . .	33	16	15.0	17.9	14.0	17.4	20.0	24.0	18.05	. .	30.114	34.8	29.1		
	36	β Geminorum	4	. . .	10	30	6.2	8.9	6.6	9.0	12.9	13.0	9.43	. .	30.110	34.5	30.0		33.
	37	15 Argus	4	. . .	62	43	42.5	46.1	43.1	44.2	48.5	49.6	45.67	. .	30.106	34.0	28.6		34.
	38			− 4 33.0	307	46	4.8	6.9	5.6	5.9	11.5	12.0	7.78	. .	30.096	33.5	27.5		33.
	39	λ Ursæ Minoris, S. P.	4	− 0 1.0			4.0	6.9	5.1	5.8	11.6	11.9	7.55	. .					
	40			+ 5 47.0			5.1	7.2	5.9	5.9	12.0	12.2	8.05	. .	30.096	33.2	27.6		33.
	†41	ε Hydræ	4	. . .	31	54	26.9	29.2	26.0	26.8	30.1	32.9	28.65	. .	30.096	33.0	27.5	37.5	32.
	42	ι Ursæ Majoris	4	. . .	350	15	33.9	35.1	36.0	36.0	38.9	40.2	36.68	. .	30.092	33.0	27.3		33.
	†43	Moon, N. L. (Mic.)	3	− 0 17.3	30	19	35.1	36.5	35.0	35.7	39.0	45.7	37.83	29.916	30.104	33.0	26.0		35.
	†44	Moon, S. L.	6	+ 0 35.0	30	49	28.9	29.9	28.0	29.0	31.2	35.1	30.35	. .				37.5	35.
	†45	α Lyræ	4	. . .	0	15	1.4	2.7	2.5	2.5	7.0	6.7	3.80	. .	30 120	33.0	36.5	36.0	37.
15	†46	Sun, S. L. (Mic)	1	− 0 50.0	60	14	60.0	60.5	61.5	58.5	65.3	65.0	61.80	30.618	30.058	36.0	40.2	36.0	38.
	†47	Sun, N. L.	4	. . .	59	41	48.4	49.5	50.0	48.6	53.4	56.0	50.97	. .					
18	48	α Andromedæ	4	. . .	10	38	51.5	54.6	54.0	53.7	59.0	57.5	55.05	. .	30.250	33.0	24.0	40.5	32.
	49	γ Pegasi	4	. . .	24	33	26.5	28.3	26.3	27.0	26.3	32.5	27.82	. .	30.250	33.0	24.0	40.5	32.
	50	α Cassiopeiæ	4	. . .	343	12	8.6	10.3	10.7	8.4	14.0	15.0	11.17	. .					
	51	Polaris	1	—29 15.3	310	24	28.7	28.3	29.5	25.8	28.8	34.8	29.32	. .	30.250	31.5	24.0		31.
	52		3	— 9 44.3		25	7.7	9.3	10.0	7.4	12.5	12.3	9.87	. .					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	"			' "
Jan. 14, 20*h*.	30.060	62.83	Sun	14	16 19.06
			Moon	43	14 48.02
" 15,	30.057		Sun	46	16 18.33

Jan. 14. Before Polaris, adjusted in azimuth: found circle end of axis slightly elevate
Jan. 14. Error of Runs —0″32 Temp. of circle 37°, of stone 37°
Jan. 15. do. do. .19 do. do. 40° do. 40°
Jan. 18. do. do. .56 do. do. 40° do. 40°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

'RRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observer.
rument.	Objects.		359° 59′		1850.0	
″	′ ″	° ′ ″	″	° ′ ″	″	
0.12	— 0 45.14	143 41 22.34	62.56	+ 2 34 59.03	+64.14	P.
0.08	— 0.43.93	144 35 14.95		+ 3 28 51.64	60.50	
0.01	+ 0 11.36	190 25 4.17		+ 49 18 40.86	43.03	
0.08	0 16.93	15 16 12.79		+ 23 37 29.02	44.90	
0.05	1 21.40	52 50 52.32		— 13 57 10.51	52.44	
0.04	0 23.66	22 18 2.27		+ 16 35 39.44		
0.16	+ 0 25.98	22 42 3.77		+ 16 11 38.04	34.35	
0.16	— 0 7.58	353 3 37.84		+ 45 50 3.97	16.67	
0.04	+ 0 11.43	10 25 29.27		+ 28 28 12.54	17.88	
0 0.19	0 50.80	39 18 54.99		— 0 25 13.18	21.79	
0 0.02	3 20.80	73 3 30.25		— 34 9 48.44	23.53	
-0 0.10	0 38.08	31 31 25.51		+ 7 22 16.30	13.49	
-0 0.07	0 0.26	0 15 2.99	62.36	+ 38 38 38.62	10.11	C.
-0 5.48	1 35.25	60 10 39.88		— 21 16 58.27		
+0 0.22	+ 1 37.47					
4.68	— 1 10.27	310 23 59.01	62.44	+ 88 29 41.93	53.46	
5.37	.28	59.69				
5.21	.28	59.63				
4.89	.28	59.21				
4.97	.28	59.29				
0.01	.28	59.36				
0.86	.29	60.20				
0.93	.29	60.27				
0.56	.29	59.90				
0.76	.29	60.10				
1.30	.29	60.64				
4.79	— 1 10.30	59.92				
+0 0.07	+ 0 37.49	31 31 27.19	62.65	+ 7 22 14.71	13.57	
—0 0.13	+ 0 17.85	16 18 38.34		+ 22 35 3.56	+ 2.70	
+0 2.62	— 1 8.47	311 38 12.27		+ 87 15 29.87	— 7.63	
—0 0.06	.48	12.16				
+0 2.63	— 1 8.49	11.67				
3.19	+ 1 28.15	55 24 26.21		— 16 30 44.31	5.66	
0.05	2 27.19	67 39 53.26		— 28 46 11.36	5.32	
0.13	0 40.03	33 16 58.21		+ 5 36 43.69	23.03	
+0 0.02	0 11.29	10 30 20.74		+ 28 23 21.16	20.77	
-0 0.11	+ 1 58.00	62 45 43.56	62.77	— 23 52 1.54	—28.91	
-0 0.70	— 1 18.85	307 44 48.23		+ 88 51 6.34	+31.55	
+0 0.12	.84	.83				
-0 1.19	— 1 18.84	.02				
-0 0.06	+ 0 38.09	31 55 6.68		+ 6 58 35.34	—38.00	
+0 0.07	— 0 10.51	350 15 26.24		+ 48 38 15.78	—38.55	
+0 11.82	26 57.14	30 7 40.52		+ 8 46 0.50		
-0 5.27	26 56.54					
0.07	+ 0 0.26	0 15 3.99	63.20	+ 38 38 38.46	+10.44	P.
-0 36.12	1 36.27	59 59 43.48		— 21 6 1.03		
+0 0.08	1 34.10					
+0 0.09	0 11.65	10 39 6.79	62.17	+ 28 14 34.63	68.45	
-0 0.09	+ 0 28.31	24 33 56.04		+ 14 19 45.38	73.43	
-0 0.15	— 0 18.71	343 11 52.61		+ 55 41 48.81	+60.69	
44.03	1 12.69	310 24 0.66				
-0 4.90	— 1 12.80	1.77				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
January 13.		4h.,	50m.				
179° 59′	60″3	61″5	65″4	58″6	67″5	62″6	62″65
	59.8	63.5	66.5	58.0	68.3	60.7	62.80
	60.5	62.0	65.5	59.0	68.3	62.7	63.00
P.	59.3	62.0	65.0	58.5	68.0	60.7	62.25
	60.0	62.0	65.5	58.7	68.3	62.0	62.75
	60.0	62.0	65.5	58.7	68.3	61.6	62.68
Means	59.98	62.17	65.57	58.58	68.12	61.72	62.688 —.130
January 14.		20h.					
179 59	59.3	61.1	66.1	55.5	71.0	60.9	62.32
	59.5	61.8	66.2	55.9	70.1	61.4	62.48
	59.3	61.5	66.6	55.9	70.7	61.1	62.52
C.	59.9	60.9	65.9	55.5	70.0	61.4	62.27
	60.0	61.2	66.8	56.0	70.2	62.0	62.70
	60.1	60.9	66.1	56.5	70.0	62.3	62.65
Means	59.68	61.24	66.28	55.88	70.33	61.52	62.489 —.132
January 14.		4h.					
179 59	60.1	61.9	61.1	60.0	67.6	66.0	62.78
	60.0	61.7	61.2	60.0	67.4	66.0	62.72
	60.0	61.7	61.2	60.0	67.2	66.0	62.68
C.	59.6	61.3	61.0	60.0	67.1	66.0	62.50
	60.5	61.0	60.7	60.9	65.4	68.0	62.75
	60.4	60.7	60.2	60.8	65.5	67.7	62.55
Means	60.10	61.38	60.90	60.28	66.70	66.62	62.664 —.131
January 14.		9h.					
179 59	59.0	62.9	61.1	60.8	66.9	64.8	62.58
	59.9	62.6	61.6	61.6	66.2	66.0	62.98
	59.9	63.0	61.9	62.0	67.2	66.2	63.37
C.	59.6	62.3	61.0	60.9	66.2	65.3	62.55
	59.7	63.0	61.9	61.6	67.1	66.0	63.22
	59.3	62.4	61.2	61.2	66.5	65.5	62.68
Means	59.57	62.70	61.45	61.35	66.68	65.63	62.897 —.129
January 15.		20h.					
179 59	61.5	61.0	62.3	61.4	64.5	68.0	63.12
	60.6	63.0	63.0	60.6	66.8	66.4	63.40
	61.3	62.4	62.3	61.2	65.4	67.4	63.33
P.	61.5	63.0	63.0	61.4	66.6	67.8	63.88
	61.0	62.4	62.4	61.4	65.0	67.0	63.20
	61.0	62.4	62.0	61.0	65.0	67.0	63.07
Means	61.15	62.37	62.50	61.17	65.55	67.27	63.333 —.130
January 18.		2h.,	20m.				
179 59	59.0	61.6	61.0	63.0	62.5	67.0	62.35
	59.0	63.0	62.2	62.2	64.3	65.4	62.68
	59.0	62.2	61.5	63.0	62.7	65.3	62.28
P.	58.5	62.2	61.5	63.0	63.3	66.0	62.42
	58.7	62.5	61.5	63.0	64.0	65.7	62.57
	57.8	62.0	60.0	61.5	62.5	65.0	61.47
Means	58.67	62.25	61.28	62.62	63.22	65.73	62.294 —.129

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
13, No. 2	39.0	35.0	35.0
14, " 1	36.3	40.8	38.0
		41.0	38.0
" 2	37.5	37.0	37.0
		39.0	37.8
" 3	37.5	33.8	34.0
		35.0	35.0
15, " 1	36.0	40.0	37.0
18, " 1		32.0	32.0

2, 7, 41 to 44. Very unsteady.
3. Mercury tremulous.
15. Observed after passing the wire; cor. for divisions + 0″.06.
28. Steady—large; observed without cap; atmosphere hazy.
33. Observed between mic. and fixed wires.
43. Cor. for defective illumination —24″.10.
45 to 47. Atmosphere smoky.
46. Cor. for divisions —0″.07.
47. do. do. —0″.02.

DATE. 1846.	No. for ref.		OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMET			
								A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up
				No.	M. S.	°	′	″	″	″	″	″	″	″	Rers.	In.	°	°	°	°
Jan. 18	1		Polaris	4	— 0 3.3	310	25	12.0	14.5	14.4	12.3	17.0	17.0	14.53	. .		29.5	23.0		30.
	2			5	+ 9 40.7			7.3	9.2	8.4	7.2	11.5	11.6	9.20	. .					
	3			6	19 21.7		24	52.4	53.3	54.0	53.0	55.7	59.0	54.57	. .					
	4			7	+29 10.7			28.3	29.3	29.0	28.0	29.4	34.3	29.72	. .	30.266	27.7	22.0		30.
	5		Jupiter, S. L.	4	. . . .	27	49	53.3	57.3	55.4	57.2	60.3	61.0	57.42	. .	30.274	28.5	21.7		
	6		Jupiter, N. L. (Mic.) . .	4	. . . .	“	“	“	“	“	“	“	“	“	30.698					
	7	γ	Ceti	4	. . . .	36	17	53.5	55.0	54.5	56.0	57.4	56.3	55.45	. .		27.0	21.0		31.
	8		Persei, (871)	4	. . . .	1	12	36.6	40.1	38.4	40.4	39.7	43.7	39.82*d*	. .	30.306	27.5	21.0		
	9	α	Ceti	4	. . . .	35	23	59.0	62.4	60.6	62.6	64.5	65.3	62.40	. .	30.306	27.5	21.0		30.
	10	α	Persei	4	. . . .	349	35	10.3	12.0	13.0	14.6	14.5	16.5	13.48	. .		27.0	20.7		29.
	11	γ¹	Eridani	4	. . . .	52	49	26.0	29.0	26.0	30.0	28.5	33.7	28.87	. .	30.312	26.0	20.0		27.
	12		(1110 Rümker) . . .	4	. . . .	22	0	38.0	42.0	41.0	42.6	42.7	46.7	42.17	. .		25.0	19.5		
	13	α	Tauri	4	. . . .	22	41	32.5	36.7	35.0	35.4	37.4	39.7	36.12	. .		24.0	19.5		25.
	14	α	Lyræ	4	. . . .	0	15	2.7	4.3	4.3	3.6	9.2	6.0	5.02	. .	30.426	29.0	26.2		31.0
19	15		Sun, S. L.	4	. . . .	59	26	39.7	42.5	44.3	40.6	47.4	46.0	43.42	. .	30.404	30.5	38.4	35.5	34.0
	16		Polaris	3	— 9 48.0	310	25	5.5	7.3	9.8	3.2	13.0	8.4	7.87	. .	30.380	31.0	27.0	35.0	32.
	17			4	— 0 2.0			10.0	12.4	13.6	8.5	16.7	13.0	12.37	. .					
	18			5	+ 9 42.0			6.3	8.0	9.0	4.6	12.4	9.0	8.22	. .			26.0		
	19			6	19 24.0		24	51.3	51.2	53.0	48.3	55.6	55.0	52.40	. .					
	20			7	+29 10.0			29.0	28.0	30.3	24.0	30.3	32.8	29.06	. .	30.390	30.5	25.5		29.
	21		Jupiter, S. L.	4	. . . .	27	47	59.7	63.2	61.6	61.6	67.3	65.6	63.17	. .	30.386	30.0	24.7		
	22		Jupiter, N. L., (Mic.) .	4	. . . .	“	“	“	“	“	“	“	“	“	30.720					
	23	γ	Ceti	4	. . . .	36	17	52.7	54.8	55.7	53.4	60.0	57.0	55.59*d*	. .	30.392	29.8	23.5		
	24	ρ	Persei	4	. . . .	0	39	7.0	9.4	9.0	8.8	12.3	11.3	9.63	. .	30.394	29.7	22.7		28.
	25	α	Persei	4	. . . .	349	35	10.5	12.2	15.0	11.8	17.0	13.6	13.35	. .	30.396	29.0	22.7		28.
	26	η	Tauri, (Mic.)	4	. . . .	15	14	2.7	4.0	4.5	1.0	8.5	5.0	4.28	28.285	30.400	29.0	20.8		30.
	†27	γ¹	Eridani	4	. . . .	52	49	27.5	29.0	30.0	27.3	31.0	31.6	29.40	. .			20.0		28.
	28		Vesta	4	. . . .	21	58	5.4	7.0	7.2	6.0	11.4	9.5	7.75	. .		29.0	20.0		
	29	α	Tauri	4	. . . .	22	41	33.3	37.0	38.0	33.7	41.4	39.5	37.15	. .	30.408	28.2	18.5		30.0
	30	α	Aurigæ	4	. . . .	353	3	40.2	43.0	44.0	40.6	47.0	45.6	43.40	. .	30.410	27.7	19.5		28.5
	31	β	Tauri	4	. . . .	10	25	13.0	16.0	15.7	15.0	19.3	17.4	16.07	. .		27.2	19.0		
	32	α	Leporis	4	. . . .	56	48	25.7	29.7	29.0	28.3	30.0	32.3	29.17	. .	30.414	27.0	18.0		27.5
	33	α	Columbæ	4	. . . .	73	0	2.0	7.0	5.0	6.4	10.4	7.6	6.40	. .					
	†34	α	Orionis	4	. . . .	31	30	41.0	45.0	44.7	43.6	48.7	47.5	45.08	. .	30.416	26.5	17.6		25.5
21	35	α	Lyræ	4	. . . .	0	15	0.5	4.0	4.0	0.6	10.0	6.0	4.18	. .	30.220	31.5	31.5	33.2	31.
22	36		Sun, S. L.	3	— 0 16.0	58	47	12.6	16.7	16.6	13.2	21.2	22.0	17.05*d*	30.326					32.
	37		Sun, N. L.	4†	+ 0 4.0	58	14	22.1	28.0	25.9	24.2	28.5	32.4	26.85	. .	30.240	32.0	32.0		33.
	38		Venus, S. L	4	. . . .	43	4	43.7	44.7	45.5	42.3	47.8	49.6	45.60	. .	30.310	35.4	31.2		34.
	†39		Venus N. Cusp. (Mic.) .	4	. . . .	“	“	“	“	“	“	“	“	“	30.682					
	40		Polaris, (Mic.)	4	— 1 49.1	310	24	61.2	62.1	61.9	57.7	66.9	68.0	62.97	29.918	30.342	33.0	28.2	33.3	31.
	41				1 22.1										.914					
	42				0 52.1										.914					
	43				— 0 22.1										.911					
	44				+ 0 13.9										.912					
	45				0 37.9										.908					
	46				1 7.9										.914					
	47				1 37.9										.917					
	48				2 7.9										.918					
	49				2 37.9	310	24	61.1	61.5	61.9	57.3	66.1	66.9	62.47	.920			28.0		30.
	†50		Mars, N. L.	6	. . . .	30	39	29.0	29.1	29.1	27.7	32.1	36.6	30.60	. .	30.348	33.0	27.7	33.5	30.
	51		Mars, S. L., (Mic.) . .	4	. . . .	“	“	“	“	“	“	“	“	“	29.909					
	52		Jupiter, S. L.	4	. . . .	27	41	47.1	49.9	49.0	49.0	54.2	55.8	50.83	. .	30.368	32.0	25.7		29.

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 r.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Jan. 18, 2*h*.	30.068	62.83	Jupiter .	5	0 19.80
“ 19, 2*h*.	30.064		Jupiter .	21	0 20.61
“ 22, 20*h*.	30.058		Sun . .	36	16 17.73
			Venus .	38	0 20.14
			Mars .	50	0 4.57
			Jupiter .	52	0 18.95

Jan. 19. Error of Runs —0″.65 Temp. of circle 30° ; of stone 35°
Jan. 22. do. .35 do. 32° ; do. 32°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 0.03	— 1 12.85	310 24 1.71	62.17	+ 88 29 40.26	+53.60	P.
4.85	12.92	1.13				
19.47	13.00	1.04				
0 43.78	— 1 13.08	0.42				
0 0.00	+ 0 32.07	27 50 9.69		+ 11 3 31.73		
0 39.58	32.05					
0 0.16	45.84	36 18 41.13		+ 2 35 0.29	64.50	
0 0.07	1.29	1 12 41.18		+ 37 41 0.24	52.31	
0 0.11	+ 0 44.39	35 24 46.68		+ 3 28 54.74	60.86	
-0 0.02	— 0 11.51	349 35 1.99		+ 49 18 39.43	42.77	
-0 0.08	+ 1 22.45	52 50 51.24		— 13 57 9.82	53.07	
-0 0.08	0 25.34	22 1 7.59		+ 16 52 33.83	41.10	
0.29	26.22	22 42 2.63		+ 16 11 38.79	34.52	
0.01	+ 0 0.27	0 15 5.30	62.22	+ 38 38 36.17	11.67	
0.18	—14 39.64	59 12 3.96		— 20 18 22.48		
4.96	1 12.53	310 23 60.30	62.25	+ 88 29 41.53	53.67	
0.03	.61	59.79				
4.86	.69	60.39				
19.54	.75	59.19				
+0 44.01	— 1 12.81	60.26				
-0 0.19	+ 0 31.95	27 48 14.32		+ 11 5 27.18		
-0 41.39	31.93					
+0 0.10	45.76	36 18 41.45		+ 2 35 0.05	64.57	
-0 0.11	+ 0 0.70	0 39 10.22		+ 38 14 31.20	49.55	
+0 0.03	— 0 11.48	349 35 1.90		+ 49 18 39.60	42.73	
+1 51.84	+ 0 17.11	15 16 13.23		+ 23 37 28.27	45.00	
-0 0.07	1 22.67	52 50 52.00		— 13 57 10.50	53.19	
-0 0.21	0 23.65	21 58 31.19		+ 16 55 10.31		
+0 0.25	+ 0 26.35	22 42 3.75		+ 16 11 37.75	34.55	
-0 0.15	— 0 7.66	353 3 35.59		+ 45 50 5.91	16.00	
+0 0.03	+ 0 11.59	10 25 27.69		+ 28 28 13.81	17.69	
-0 0.19	1 36.23	56 50 5.21		— 17 56 23.71	25.45	
+0 0.01	3 24.11	73 3 30.52		— 34 9 49.02	25.00	
+0 0.12	0 38.72	31 31 23.92		+ 7 22 17.58	13.96	
-0 0.07	0 0.27	0 15 4.38	62.18	+ 38 38 37.05	12.43	C.
-0 16.76	1 32.82	58 32 15.38		— 19 38 33.95		
+0 0.04	1 30.76					
-0 0.02	0 43.86	43 5 9.30	61.83	— 4 11 28.22		
-0 39.22	+ 0 42.78					
-0 8.97	— 1 12.25	310 23 59.44	61.72	+ 88 29 41.43	+53.84	
9.14	.25	.61				
9.08	.25	.53				
9.22	.26	.68				
9.15	.26	.60				
9.40	.27	.85				
9.06	.27	.51				
8.93	.27	.38				
8.95	.28	.40				
8.93	— 1 12.28	.38				
0.54	+ 0 33.39	30 40 9.11		+ 8 13 31.86		
9.68	.40					
0 0.20	+ 0 31.73	27 42 3.80	61.27	+ 11 11 36.77		

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
January 19.		20h.,	30m.				
179° 59′	60″0	61″4	62″0	60″4	65″0	65″0	62″30
	58.7	63.0	62.8	59.5	66.5	63.7	62.37
	59.4	62.7	63.0	59.0	66.0	63.6	62.28
P.	59.4	62.7	63.0	59.0	66.2	63.6	62.32
	59.4	62.7	63.0	59.4	66.5	63.6	62.43
	59.4	62.7	63.0	59.4	66.5	63.6	62.43
Means	59.38	62.53	62.80	59.45	66.12	63.85	62.355 —.131
January 19.		2h.,	20m.				
179 59	60.5	61.0	62.2	61.0	63.2	66.0	62.32
	58.5	62.7	63.3	59.8	66.5	62.8	62.27
	59.7	61.7	62.5	60.6	65.0	65.2	62.45
P.	58.5	63.0	63.0	60.6	66.3	63.6	62.50
	59.5	62.2	63.0	60.6	65.0	64.2	62.42
	58.7	62.5	62.4	60.6	65.4	64.2	62.30
Means	59.23	62.18	62.73	60.53	65.23	64.33	62.375 —.129
January 22.		20h.,	30m.				
179 59	57.9	62.2	63.5	58.8	67.2	64.4	62.33
	59.6	61.4	62.1	59.4	66.1	66.4	62.50
	59.1	61.8	62.4	69.6	65.8	66.4	62.52
C.	59.8	60.0	61.0	59.5	63.2	67.6	61.85
	59.0	62.1	63.0	58.8	66.4	65.4	62.45
	59.9	61.0	62.0	58.9	64.8	66.6	62.20
Means	59.22	61.42	62.33	59.17	65.58	66.13	62.308 —.131
January 22.		3h.,	30m.				
179 59	56.3	63.0	60.2	60.0	67.0	63.0	61.58
	57.1	62.8	60.9	60.2	66.4	64.4	61.97
	57.0	62.1	60.2	60.6	66.1	64.4	61.73
C.	56.2	61.0	59.8	59.6	65.2	63.4	60.87
	56.3	61.0	59.7	59.9	65.0	63.6	60.92
	56.9	61.3	60.3	60.0	65.3	64.3	61.35
Means	56.63	61.87	60.18	60.05	65.83	63.85	61.403 —.132

THERMOMETERS.

R POINTS.	Stone.	Upper.	Lower.
	°	°	°
19, No. 1	35.5	35.0	33.5
" 2	35.0	32.5	32.0
22, " 1	33.2	32.7	34.0
"	. .	32.2	34.0
" 2	34.0	29.0	30.2
"	. .	30.0	31.0

27 to 34. Very unsteady.
52. Very steady.
39. Correction for defective illumination, —1″.06.
Nadir Point, Jan. 22, No. 1, Mercury very unsteady.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMET At.	Ext.	St.	Up
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
Jan. 22	1	Jupiter, N. L. (Mic.)	4	. . .	27 41 47.1	49.9	49.0	49.0	54.2	55.8	50.83	30.662					
	2	α Ceti	4	. . .	35 24 1.5	3.4	2.1	2.6	8.9	7.4	4.32	. .	30.362	31.5	22.7		28.
	3	α Persei	4	. . .	349 35 9.3	11.9	12.7	11.6	16.2	15.1	12.80	. .	30.364	31.5	21.9		28.
	4	α Tauri	4	. . .	22 41 35.0	37.3	36.6	35.7	41.0	41.4	37.83	. .	30.364	30.2	23.0	34.0	28.
	5	α Lyræ	4	. . .	0 15 2.7	2.8	3.0	1.9	7.7	7.8	4.32	. .	30.536	27.7	25.0	33.2	29.
23	†6	Sun, N. L. (Mic.)	3½	— 0 5.0	58 0 19.9	24.9	22.1	21.2	25.5	30.0	23.93	30.029	30.496	30.4	29.5		33.
	7	Sun, S. L.	5½	+ 0 19.0	58 32 52.3	57.5	55.2	55.1	61.2	63.1	57.40*d*	. .					31.
	8	α Cygni	4	. . .	354 9 37.7	40.8	40.9	37.0	42.0	45.3	40.62	. .	30.479	30.5	29.2		32.
	9	Venus, S. L.	4	. . .	42 41 29.1	30.4	30.8	27.0	32.4	35.0	30.78	. .	30.438	32.7	30.6	33.2	33.
	†10	Venus, N. Cusp. (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.686					
	11	Polaris, (Mic.)	4	— 3 21.1	310 24 58.0	60.6	61.5	54.0	66.4	63.2	60.62	29.902	30.422	31.2	27.9	33.0	31.
	12			2 51.1								.901					
	13			2 21.1								.890					
	14			1 51.1								.884					
	15			1 21.1								.898					
	16			0 51.1								.899					
	17			— 0 21.1								.889					
	18			+ 0 3.9								.890					
	19			0 38.9								.891					
	20			1 8.9								.891					
	21			1 38.9								.891					
	22			2 8.9								.892					
	23			2 38.9								.896					
	24			+ 3 8.9	58.6	60.2	61.4	53.9	66.8	63.8	60.78	.894			27.7		30.7
	25	Jupiter, S. L.	4	. . .	27 39 38.6	41.6	42.1	37.7	46.1	45.1	41.87	. .	30.416	30.7	24.7		29.5
	26	Jupiter, N. L. (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.693					
	†27	α Aurigæ	4	. . .	353 3 39.2	43.8	44.0	40.0	48.3	45.4	43.45	. .	30.382	27.2	17.0	33.0	26.5
	†28	β Tauri	4	. . .	10 25 11.1	16.0	15.0	13.4	19.4	16.1	15.17	. .	30.380	27.0	16.0		26.5
	29	α Columbæ	4	. . .	73 0 4.9	10.0	8.5	6.6	14.1	10.1	9.03	. .	30.376	27.0	15.6		25.5
	30	α Orionis	4	. . .	31 30 44.5	48.6	48.6	44.4	53.8	51.0	48.48	. .	30.374	26.0	16.2		24.5
	†31	α Lyræ	4	. . .	0 15 8.6	6.7	12.5	7.7	10.7	8.6	9.13	. .	30.316	26.0	28.3	30.5	28.5
24	†32	Sun, S. L. (Mic.)	1	— 0 49.0	58 19 60.0	58.6	63.6	60.5	64.5	64.2	61.90	31.300	30.266	30.0	34.5		33.5
	33	Sun, N. L.	4	. . .	46 7.7	6.0	11.6	7.3	11.3	11.5	9.23	. .					
	34	Venus, S. L.	4	. . .	42 18 41.5	40.0	44.9	39.3	45.0	45.7	42.58	. .	30.232	32.5	35.7	31.0	35.5
	†35	Venus, N. Cusp. (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.670					
	36	Polaris	2	—19 34.7	310 24 49.5	49.8	53.7	44.0	56.4	51.0	50.73	. .	30.230	34.0	34.7	31.0	34.
	37		3	9 44.7	25 4.8	5.2	8.7	0.3	11.6	6.6	6.20	. .					
	38		4	— 0 1.7	10.2	9.6	14.5	5.4	16.0	12.2	11.32	. .			35.0		
	39		6	+19 22.3	24 51.0	48.0	53.3	45.4	55.0	54.5	51.20	. .					
	40		7	+29 10.3	27.5	23.5	29.0	21.4	28.5	30.8	26.78	. .		34.0	34.0		35.
	41	Jupiter, S. L.	4	. . .	27 37 29.1	27.1	31.2	25.5	30.5	33.7	29.52*d*	. .	30.224	34.5	33.0		34.
	42	Jupiter, N. L. (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.696					
	43	γ Ceti, (Ref.)	4	. . .	143 42 6.2	2.8	7.4	3.3	10.5	10.3	6.75	. .		34.3	31.0		34.
	44	α Ceti, (Ref.)	4	. . .	144 35 58.6	56.3	60.2	53.8	65.2	62.4	59.42	. .	30.209	34.9	30.0		
	45	α Persei, (Ref.)	4	. . .	190 24 51.0	47.6	54.0	48.0	54.8	55.3	51.78	. .	30.194	34.0	29.3		33.
	†46	Tauri, 1164, (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.683					
	47	η Tauri	4	. . .	15 15 57.0	54.3	59.4	52.0	61.3	59.4	57.23	. .	30.182	34.0	28.5		33.
	48	γ^1 Eridani	4	. . .	52 49 33.6	31.3	36.5	29.6	35.5	37.4	33.98	. .					
	49	Vesta	4	. . .	21 40 10.6	7.0	10.3	7.0	14.2	15.2	10.72	. .	30.170	33.7	28.0		
	50	α Tauri	4	. . .	22 41 37.6	35.3	39.3	34.0	41.3	42.0	38.25	. .	30.158	33.0	27.3		
	51	α Aurigæ	4	. . .	353 3 42.6	40.3	45.2	38.6	47.3	47.4	43.57	. .	30.144	33.0	26.5		32.
	†52	β Tauri	4	. . .	10 25 15.3	13.2	16.4	13.5	19.0	19.0	16.07	. .					

DATE.	MICROMETER. Coincid.	Val. 1 *r.*	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Jan. 23, 23*h.*	30.057	62.83	Sun	6	16 17.46
			Venus	9	0 20.32
			Jupiter	25	0 19.99
" 24, 20*h.*	30.050		Sun	32	16 15.48
			Venus	34	0 20.01
			Jupiter	41	0 20.30

Jan. 23. Error of Runs —0″.70. Temp. of circle 29°; of stone 33°
Jan. 24. do. do. .18 do. do. 33°; do. 31°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

RECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
ment.	Objects.		39° 59′		1850.0	
″	′ ″	° ′ ″	″	° ′ ″	″	
37.69	+ 0 31.71		61.27			C.
0.07	+ 0 44.30	35 24 48.55		+ 3 28 51.97	+61.14	
0.02	— 0 11.48	349 35 1.34		+ 49 18 39.18	42.63	
0.20	+ 0 26.07	22 42 4.10		+ 16 11 36.42	34.65	
0.06	0 0.27	0 15 4.53	61.67	+ 38 38 36.39	12.69	
0.85	1 31.25	58 18 13.49		— 19 24 32.57		
0.25	+ 1 33.31					
0.04	— 0 6.32	354 9 34.26		+ 44 44 6.66	42.33	
0.15	+ 0 43.31	42 41 53.92		— 3 48 13.00		
39.37	+ 0 42.19					
10.34	— 1 12.50	310 23 58.54	62.00	+ 88 29 42.62	53.88	
10.23	.50	58.43				
10.78	.50	58.98				
11.03	.50	59.25				
10.07	.51	58.26				
9.94	.51	58.13				
10.52	.51	58.71				
10.44	.51	58.63				
10.40	.52	58.57				
10.42	.52	58.60				
10.49	.52	58.67				
10.51	.53	58.68				
10.38	.53	58.55				
10.65	— 1 12.53	58.82				
0.04	+ 0 31.80	27 39 53.64		+ 11 13 47.61		
40.00	+ 0 31.79					
0.23	— 0 7.69	353 3 35.53		+ 45 50 5.72	15.59	
0.04	+ 0 11.64	10 25 26.85		+ 28 28 14.40	17.57	
0.03	3 24.89	73 3 33.95		— 34 9 52.70	25.92	
0.15	0 38.78	31 31 27.41		— 7 22 13.84	14.25	
0.06	0 0.25	0 15 9.32	65.22	+ 38 38 35.15	12.94	P.
19.49	1 28.62	58 3 55.55		— 19 10 11.08		
0.06	-1 30.78					
0.03	0 41.50	42 19 4.04		— 3 25 19.57		
38.92	+ 0 40.37					
19.74	— 1 11.04	310 23 59.43	62.13	+ 88 29 41.63	53.90	
4.83	.01	60.02				
0.01	.00	60.33				
19.34	.08	59.46				
44.05	.16	59.67				
0.05	+ 0 30.99	27 37 40.26		+ 11 16 1.12		
40.53	+ 0 30.97					
0.10	— 0 44.78	143 41 22.07		+ 2 34 59.19	64.90	
0.05	— 0 43.41	144 35 16.06		+ 3 28 53.18	61.27	
0.01	+ 0 11.25	190 25 3.02		+ 49 18 40.14	42.58	
39.73	0 16.71	15 15 34.21		+ 23 38 7.17	44.86	
0.03	0 16.71	15 16 13.97		+ 23 37 27.41	45.11	
0.02	+ 1 20.61	52 50 54.57		— 13 57 13.19	53.74	
. .	0 22.75	21 40 33.47		+ 17 13 7.91		
0.11	+ 0 25.65	22 42 4.01		+ 16 11 37.37	34.72	
0.04	— 0 7.49	353 3 36.04		+ 45 50 5.34	15.49	
0.01	+ 0 11.31	10 25 27.39		+ 28 28 13.99	+17.55	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
January 23.		22*h*.,	30*m*.				
179° 59′	57″6	63″0	60″9	58″3	65″1	64″4	61″55
	58.0	62.0	60.9	58.9	65.0	65.0	61.63
	57.7	62.5	61.0	59.0	65.7	64.9	61.80
C.	58.0	62.1	61.1	59.8	65.1	65.9	62.00
	57.8	62.1	61.0	59.7	65.0	65.4	61.83
	58.1	62.0	61.1	59.8	65.2	65.8	62.00
Means	57.87	62.28	61.00	59.25	65.18	65.23	61.803 —.133
January 23.		1*h*.,	30*m*.				
179 59	59.5	60.9	62.2	58.1	66.4	65.8	62.15
	59.1	61.6	62.4	58.2	66.9	65.1	62.22
	59.6	61.4	62.6	57.8	66.9	65.0	62.22
C.	59.4	61.1	62.2	58.0	66.8	65.0	62.08
	59.4	61.2	62.3	58.1	66.9	64.8	62.12
	58.0	62.4	63.0	57.0	68.6	62.9	61.98
Means	59.17	61.43	62.45	57.87	67.08	64.77	62.128 —.130
January 23.		19*h*.					
179 59	64.7	62.2	69.6	63.6	67.2	64.5	65.30
	63.0	63.0	69.6	62.8	67.0	64.0	64.90
	65.0	63.8	70.0	64.2	67.6	66.0	66.10
P.	63.7	63.0	69.6	63.5	67.0	65.0	65.30
	63.7	63.0	69.6	63.5	67.0	65.0	65.30
	63.7	63.0	69.3	63.5	67.0	64.5	65.17
Means	63.97	63.00	69.62	63.52	67.13	64.83	65.345 —.128
January 24.		5*h*.					
179 59	61.3	59.0	64.0	58.0	65.6	65.4	62.22
	60.0	59.4	64.0	56.0	67.2	62.5	61.52
	61.0	59.0	64.0	57.6	66.2	64.2	62.00
P.	60.5	60.6	65.0	58.0	67.5	63.3	62.48
	61.0	60.2	65.0	58.5	67.5	64.2	62.73
	60.6	60.2	64.6	58.5	67.5	64.2	62.60
Means	60.73	59.73	64.43	57.77	66.92	63.97	62.258 —.133

THERMOMETERS.

POINTS.	Stone.	Upper.	Lower.
	°	°	°
, No. 1	32.2	33.7	32.5
" 1		33.7	33.2
" 2	33.0	30.8	31.0
" 2		31.5	31.7
" 3	30.5	32.5	30.0
, " 1		32.5	32.0

6. Observed between micrometer and fixed wires.
10. Correction of N. Cusp. for defective illumination, —1″.09.
27, 28. Very unsteady.
31 to 52. Zenith point doubtful.
32 to 35. Limbs poorly defined.
35. Correction of N. Cusp for defective illumination, —1″.12.
46 to 3. (p. 54) Zenith point deduced from the declinations of the stars, 63″.27.
Nadir Point, Jan. 23, No. 3, differs greatly from the preceding and following: Temp. of stone below 32°.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.		Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMET			
								A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
				No.	m. s.	°	′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	
Jan. 24	1	δ	Orionis	4	. . .	39	18	7.0	5.5	8.0	3.8	12.0	11.5	7.97	. .			25.5		
	2	α	Columbæ	4	. . .	73	0	14.3	14.2	17.0	12.5	19.6	19.0	16.10	. .	30.130	32.7	25.0		31
	3	α	Orionis	4	. . .	31	30	48.7	47.0	51.0	44.5	54.2	53.5	49.82	. .	30.120	32.5	25.0		
26	†4		Venus, N. Cusp. . . .	4	. . .	41	33	28.0	28.5	28.7	24.3	31.2	25.1	29.30	. .	29.642	43.5	46.7	37.3	45
	5		Venus, S. L. (Mic.) . .	4	. . .	“	“	“	“	“	“	“	“	“	29.417					
	6		Polaris	3	— 9 37.6	310	24	63.8	58.8	61.6	57.7	66.1	71.1	63.18	. .	29.630	46.5	49.0	38.0	51
	7			4	— 5 16.6			66.1	61.9	64.4	59.4	69.1	73.1	65.67	. .					
	8				+ 0 13.4			67.5	63.4	65.0	61.2	70.1	75.8	67.17	. .			49.9		54
	9				4 48.4			67.0	62.1	64.6	60.8	70.0	74.4	66.48	. .					
	10			5	+ 9 48.4			62.8	58.0	60.0	56.8	65.0	70.1	62.12	. .	29.630	47.2	47.2		48
	11		Mars, S. L.	4	. . .	29	38	27.9	22.2	22.9	21.2	26.5	35.5	26.03	. .	29.628	47.5	46.1		48
	12		Mars, N. L. (Mic.) . .	4	. . .	“	“	“	“	“	“	“	“	“	30.189					
	13	α	Arietis	4	. . .	16	9	30.8	22.6	24.0	19.8	26.4	33.8	26.23	. .			45.6		
	14		Jupiter, N. L.	4	. . .	27	32	15.0	12.1	13.1	11.0	17.5	23.8	15.42*d*	. .	29.626	47.0	44.6		46
	15		Jupiter, S. L. (Mic.) . .	4	. . .	“	“	“	“	“	“	“	“	“	29.411					
27	16	α	Lyræ	4	. . .	0	15	5.9	3.9	3.4	5.0	8.3	13.0	6.58	. .	30.022	40.2	39.5	41.8	42
	17		Mercury, N. L. . . .	4	. . .	61	33	25.0	24.1	22.8	22.8	24.7	34.3	25.62	. .	30.020	41.0	43.0		42
	18		Mercury, S. L. (Mic.) .	4	. . .	“	“	“	“	“	“	“	“	“	29.933					
28	†19		Sun, S. L. (Mic.) . . .	3½	— 0 7.0	57	17	50.4	49.5	49.1	49.6	51.7	61.5	51.93*d*	30.038	30.112	43.0	45.0		44
	20		Sun, N. L.	5	+ 0 15.0	56	45	18.5	16.7	15.6	18.0	18.6	29.9	19.55	. .					45
	21		Venus, S. L.	4	. . .	40	51	22.0	18.0	19.0	19.1	21.1	33.1	22.05	. .	30.008	45.2	46.7		47
	22		Venus, N. Cusp. (Mic.) .	4	. . .	“	“	“	“	“	“	“	“	“	30.721					
	23		Polaris	3	— 9 35.5	310	24	64.6	58.9	62.0	59.0	65.0	72.1	63.60	. .	30.030	46.5	46.8	42.1	46
	24				— 4 52.5			67.9	63.0	64.7	62.9	68.1	76.1	67.12	. .					
	25			4	+ 0 13.5			69.0	64.3	65.2	63.5	69.9	77.4	68.22	. .			46.1		46
	26				5 47.5			67.0	61.7	63.2	61.6	67.4	75.6	66.08	. .					
	27			5	+ 9 54.5			64.7	58.4	61.1	59.0	64.7	72.6	63.42	. .	30.032	46.7	46.0		46
	28		Mars, S. L.	4	. . .	29	8	8.2	3.8	3.8	6.0	9.0	16.9	7.93	. .	30.034	47.0	45.8		45
	29		Mars, N. L. (Mic.) . .	4	. . .	“	“	“	“	“	“	“	“	“	30.171					
	30	α	Arietis	4	. . .	16	9	25.9	22.4	23.1	22.0	24.6	32.1	25.02	. .	30.044	46.8	42.5		46
	31		Jupiter, N. L.	4	. . .	27	27	23.8	21.7	21.5	22.5	23.0	33.9	24.40*d*	. .			43.6		46
	32		Jupiter, S. L. (Mic.) . .	4	. . .	“	“	“	“	“	“	“	“	“	29.421					
	33	γ	Ceti	4	. . .	36	17	60.2	56.5	58.4	57.3	63.1	66.5	60.33*d*	. .	30.037	46.0	41.9		44
	34	β	Ursæ Minoris, S. P. (Mic.)	4	. . .	293	42	30.1	25.5	27.7	26.4	28.8	37.3	29.30*d*	29.891	30.036	45.4	40.8		
	35	α	Ceti	6	. . .	35	24	9.1	5.1	6.2	6.2	11.0	16.6	9.03	. .	30.036	45.4	40.8		43
	36	α	Persei	4	. . .	349	45	11.9	9.0	12.0	10.9	14.6	19.2	12.93	. .	30.052	44.8	38.2		43
	†37		Weisse III, 569 . . .	4	. . .	25	29	54.0	51.0	50.8	52.8	53.9	61.9	54.07	. .	30.060	44.3	37.0		41
	†38		Anonymous, (Mic.) . .	4	. . .	“	“	“	“	“	“	“	“	“	25.172					
	39	γ¹	Eridani	4	. . .	52	49	34.9	31.4	32.9	32.1	33.7	42.6	34.60	. .	30.064	43.2	36.0		41
	40	α	Tauri, (Ref.)	4	. . .	157	18	23.8	20.9	20.6	23.0	23.4	32.4	24.02	. .	30.058	42.0	34.5	42.6	41
	41	ε	Ursæ Minoris, S. P. . .	4	. . .	301	11	61.9	57.8	60.0	60.8	63.2	70.8	62.42	. .	30.066	41.0	33.7		40
	42	β	Orionis	4	. . .	47	15	50.6	47.0	48.2	48.1	52.1	58.2	50.70	. .			33.1		39
	43	β	Tauri	4	. . .	10	25	15.0	13.5	13.0	15.7	17.0	23.2	16.23	. .	30.070	40.0	33.7		39
	44	ε	Orionis	4	. . .	40	11	17.1	15.2	15.2	17.0	18.9	27.0	18.40	. .			33.6		38
	45	α	Columbæ	4	. . .	73	0	16.1	17.0	16.3	17.8	19.6	25.5	18.72	. .	30.063	39.3	33.3		38
	46	α	Orionis	4	. . .	31	30	48.5	47.0	48.0	48.0	51.2	57.0	49.95	. .	30.046	38.7	32.7	42.6	37
	47	δ	Ursæ Minoris, S. P. . .	6	— 8 42.0	305	30	53.1	50.9	51.4	53.3	55.9	60.7	54.22	. .	30.066	37.8	32.5		38
	48			5	4 24.0			47.0	43.8	44.9	47.0	47.2	55.0	47.48	. .					
	49			4	— 0 4.5			44.9	41.0	42.0	44.7	44.0	52.0	44.77	. .			31.9		37
	50			3	+ 4 13.0			46.0	43.1	44.0	47.0	45.9	54.1	46.68	. .					
	51			2	+ 8 54.0			53.6	51.6	52.0	55.0	56.5	61.0	54.95	. .	30.078	37.5	32.0		38
	52	α	Canis Majoris.	4	. . .	55	22	58.6	58.5	58.9	61.5	63.0	67.4	61.32*d*	. .	30.080	47.2	32.1		37

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Jan. 26, 23*h*.	30.050	62.83	Venus .	4	0 20.57
			Mars .	11	0 4.30
			Jupiter .	14	0 20.17
“ 27,			Mercury	17	0 3.67
“ 28, 23*h*.	30.050		Sun . .	19	16 17.39
			Venus .	21	0 21.71
			Mars .	28	0 3.80
			Jupiter .	31	0 19.86

Jan. 26. Error of Runs —0″.10. Temp. of circle 40°; of stone 40°
Jan. 28. do. .05 do. 42°; do. 42°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
nstrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.05	+0 50.24	39 18 58.16	62.13	— 0 25 16.78	+22.98	P.
-0 0.01	3 19.19	73 3 35.30		— 34 9 53.92	26.14	
0.04	0 37.74	31 31 27.60		+ 7 22 13.78	14.32	
0.06	0 36.46	41 34 26.40	61.46	— 2 40 45.69		C.
40.02	+0 37.65					
4.81	—1 7.64	310 23 60.35		+ 88 29 40.97	53.96	
1.43	.52	59.58				
0.00	.52	59.65				
1.18	.63	60.03				
4.87	—1 7.87	59.11				
+0 0.15	+0 29.98	29 38 51.85		+ 9 14 48.87		
-0 8.46						
+0 0.04	0 16.81	16 9 43.08		+ 22 43 57.64	63.75	
0.06	0 29.53	27 33 5.18		+ 11 20 35.54		
+0 40.39	0 29.54					
-0 0.07	0 0.26	0 15 6.77	62.27	+ 38 38 34.75	14.10	
0.00	1 42.36	61 35 11.65		— 22 41 30.13		
-0 7.35	.35					
0.78	1 24.46	57 2 59.78		— 18 9 18.26		
-0 0.21	1 22.63					
-0 0.01	0 36.75	40 51 37.08		— 1 57 55.56		
-0 42.18	+0 35.50					
-0 4.78	—1 8.83	310 23 59.55		+ 88 29 42.17	54.09	
1.23	.89	59.46				
0.01	.92	59.31				
1.73	.94	58.88				
5.07	—1 8.94	59.55				
+0 0.08	+0 29.86	29 8 34.06	62.28	+ 9 45 7.47		
-0 7.52	0 29.85					
+0 0.02	0 17.16	16 9 42.20		+ 22 43 59.33	63.91	
0.05	0 29.91	27 28 14.22		+ 11 25 27.31		
39.76	0 29.93					
0.05	+0 43.52	36 18 43.90		+ 2 34 57.63	+65.17	
9.98	—2 14.48	293 40 24.80		+ 74 46 43.27	—38.57	
0.16	+0 42.20	35 24 51.39		+ 3 28 50.14	+61.53	
0.00	—0 10.80	349 45 2.13	62.29	+ 49 18 39.41	42.52	
0.00	+0 28.57	25 30 22.64		+ 13 23 18.90	50.66	
+5 6.61	0 28.68	25 35 29.36		+ 13 18 12.18	49.91	
-0 0.01	+1 19.03	52 50 53.62		+ 13 57 12.08	54.14	
-0 0.02	—0 25.18	157 17 58.82	61.97	+ 16 11 36.10	+34.86	
+0 0.12	—1 39.32	301 10 23.22		+ 82 16 42.00	— 9.35	
0.05	+1 5.31	47 16 56.06		— 8 23 14.84	+30.76	
0.01	0 11.10	10 25 27.34		+ 28 28 13.88	17.45	
0.09	0 50.95	40 12 9.44		— 1 18 28.22	22.36	
0.02	3 15.24	73 3 33.98		— 34 9 52.76	26.98	
+0 0.05	+0 37.04	31 31 27.04		+ 7 22 14.18	14.59	
-0 8.95	—1 24.59	305 29 20.68		+ 86 35 39.27	+10.46	
-0 2.19	.66	20.63				
+0 0.05	.70	20.12				
-0 2.02	.71	19.95				
-0 9.16	—1 24.72	21.07				
+0 0.06	+1 27.46	55 24 28.84		— 16 30 47.62	— 2.78	

NADIR POINTS—READINGS.							
	A.	B.	C.	D.	E.	F.	Means.
January 26.		23h.,	20m.				
179° 59′	60″4	59″8	63″1	55″8	67″4	65″4	61″98
	60.6	58.7	61.9	55.4	65.9	66.6	61.52
	60.5	58.5	62.0	55.3	66.0	65.9	61.37
C.	60.6	58.9	61.8	55.8	66.4	66.1	61.60
	60.4	58.7	62.1	55.9	66.1	66.1	61.55
	60.9	58.8	61.8	56.0	65.8	66.0	61.55
Means	60.57	58.90	62.12	55.70	66.27	66.02	61.595 —.133
January 28.		21h.					
179 59	62.6	59.1	60.1	60.0	61.7	71.0	62.42
	61.4	59.8	60.4	60.5	62.0	70.3	62.40
	61.7	59.8	60.7	60.3	62.2	70.9	62.60
C.	61.1	59.5	60.1	60.1	62.1	70.0	62.15
	61.7	60.0	60.9	60.4	62.1	70.0	62.52
	61.1	60.0	60.4	60.0	62.4	70.0	62.32
Means	61.60	59.70	60.43	60.22	62.08	70.37	62.400 —.133
January 28.		4h.					
179 59	62.0	59.1	58.6	60.9	62.3	70.9	62.30
	62.2	58.6	59.9	60.6	62.4	70.6	62.38
	62.1	58.2	59.9	60.7	62.1	70.2	62.20
C.	62.1	59.8	60.9	60.3	63.9	69.3	62.72
	61.8	59.0	60.1	60.0	63.5	69.8	62.37
	61.7	59.2	60.1	60.4	63.9	69.9	62.53
Means	61.98	58.98	59.92	60.48	63.02	70.12	62.417 —.133
January 28.		8h.					
179 59	57.9	61.2	59.8	61.2	63.0	66.0	61.52
	58.5	61.5	59.9	62.2	63.2	66.9	62.03
	58.1	61.7	59.9	62.1	63.7	66.7	62.03
C.	57.8	61.0	59.1	61.6	62.6	66.1	61.37
	58.5	61.9	60.0	62.1	63.5	67.3	62.22
	58.1	61.1	59.6	61.9	62.8	66.0	61.58
Means	58.15	61.40	59.72	61.85	63.13	66.50	61.792 —.131

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
26, No. 1	37.3	45.5	40.7
	. .	45.1	40.0
28, " 1	41.8	46.5	42.7
	. .	45.8	42.5
" 2	42.6	41.8	41.2
	. .	42.2	41.2
" 3	42.0	35.5	36.5
	. .	39.0	38.5

1 to 3, 23. Very steady.
4. Correction of N. Cusp. for defective illumination, —1″.17.
19. Observed between 3d and 4th wires.
22. Correction of N. Cusp. for defective illumination, —1″.22.
37. Apparent R. A. 3h. 30m. 45s., (7.8 mag.)
38. " " 3 34 6 (10 " ;) barely visible.
51. Observed after passing wire.
Nadir Points, Jan. 26 and 28, apparent error of collimation, 10″ E.

DATE. 1846.		No. for ref.	OBJECTS OBSERVED.		Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMETERS				
									A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.	L
					No.	M. S.	°	′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	°	
Jan.	28	1	α^1	Geminorum, (Mic.) . .	4	. . . .	,,	,,	,,	,,	,,	,,	,,	,,	,,	30.000	30.076	36.0	32.6		36.0	36
		2	α^2	Geminorum	4	. . . .	6	49	29.0	28.5	28.8	30.9	29.1	37.4	30.62	. .						
		3	α	Canis Minoris	5	. . . .	33	16	17.5	19.0	16.2	19.0	20.0	27.0	19.78	. .	30.078	36.0	33.2	42.5	36.5	37
Feb.	3	4		Venus, S. L.	4	. . . .	38	56	23.2	20.3	21.5	21.5	24.0	31.5	23.67	. .	30.108	41.0	42.0	43.0	42.5	42
		5	γ	Cephei	4	. . . .	322	7	45.5	39.9	45.1	41.5	44.4	53.0	44.90*d*	. .						
		6	α	Cassiopeiæ	4	. . . .	343	12	9.7	6.7	10.7	7.3	13.5	18.5	11.07	. .						
		†7			1	—29 8.8	310	24	26.6	23.0	25.6	22.0	24.5	34.5	26.03	. .	30.080	43.0	44.0	43.0	44.0	43
		8			2	19 13.8			50.0	47.5	51.0	46.5	52.0	57.3	50.72	. .						
		9			3	— 9 29.8		25	5.0	2.0	5.2	1.0	7.5	11.6	5.38	. .						
		10		Polaris	4	+ 0 11.2			9.5	6.0	9.6	6.0	11.6	16.0	9.78	. .			43.0			43
		11			5	9 58.2			4.7	0.5	4.4	0.5	6.6	11.4	4.68	. .						
		12			6	19 42.2		24	50.4	45.2	49.5	46.0	50.4	58.0	49.92	. .						
		†13			7	+29 32.2			26.2	31.3	24.0	21.0	24.3	34.0	25.13	. .			43.7			
		14		Mars, S. L.	4	. . . .	27	38	51.5	48.0	50.4	48.6	52.4	58.5	51.57	. .	30.080	43.0	43.0		44.0	43
		15		Mars, N. L. (Mic.) . .	4	. . . .	"	"	"	"	"	"	"	"	"	30.170						
		16	α	Arietis	4	. . . .	16	9	25.5	21.5	24.0	21.6	23.5	32.3	24.73	. .	30.070	43.5	42.7		45.0	44
		†17		Jupiter, S. L.	4	. . . .	27	12	20.0	16.0	17.5	15.5	19.1	26.1	19.03*d*	. .						
		†18		Jupiter, N. L. (Mic.) .	4	. . . .	"	"	"	"	"	"	"	"	"	30.657						
		19	γ	Ceti	4	. . . .	36	17	59.8	55.5	57.7	56.5	60.3	65.2	59.17*d*	. .		44.0	42.5			
		20	α	Ceti	4	. . . .	35	24	8.0	3.3	4.6	4.5	7.2	13.6	6.87	. .	30.080	44.0	42.5			44
		21	α	Persei	4	. . . .	349	35	13.3	9.2	12.4	11.0	13.3	19.7	13.15	. .	30.078	44.0	41.6		44.5	44
		†22		Moon, S. L.	4	. . . .	21	46	54.6	49.7	51.0	50.8	54.5	62.0	53.77	. .	30.076	44.0	41.0		44.0	44
		23	α	Lyræ	4	. . . .	0	15	6.3	3.4	4.0	5.0	7.6	13.8	6.68	. .	30.248	42.0	41.5	42.5	43.5	42
	4	24		Sun, S. L.	1	— 0 48.0	55	19	57.0	55.4	56.7	56.3	59.7	65.5	58.43	30.835	30.230	43.2	44.0	42.5	45.0	46
		25		Sun, N. L.	4	. . . .	54	46	39.8	37.8	39.7	37.5	41.6	46.5	40.48	. .						
		26		Venus, S. L.	4	. . . .	38	39	36.0	33.8	35.4	33.0	35.5	44.7	36.40	. .	30.188	45.0	45.5		46.0	44
		27	γ	Cephei	4	. . . .	322	7	44.4	38.9	43.6	39.0	43.5	51.6	43.51*d*	. .	30.184	45.0	45.5		46.5	45
		28	α	Cassiopeiæ	4	. . . .	343	12	11.0	7.7	10.7	7.0	14.4	20.0	11.80	. .	30.186	45.5	45.0			45
		†29			1	—29 17.0	310	24	26.0	24.3	25.7	20.7	26.6	32.5	25.97	. .	30.186	45.5	45.0		46.0	45
		30			2	19 28.0			50.5	48.3	50.4	46.0	54.0	57.3	51.08	. .						
		31		Polaris	3	— 9 32.0		25	5.6	2.2	5.4	0.5	8.7	12.0	5.73	. .						
		32			4	. . . .			10.3	6.7	9.6	5.5	12.6	17.0	10.28	. .						
		†33			5	+ 9 48.0			5.5	2.0	4.3	0.6	7.5	12.7	5.43	. .	30.176	46.0	46.0		46.5	45
		34		Jupiter, S. L.	4	. . . .	27	9	32.0	29.3	30.2	28.0	32.0	38.6	31.68	. .	30.168	46.0	44.5		45.5	44
		35	γ	Ceti	4	. . . .	36	17	59.0	55.4	57.0	55.3	60.6	65.3	58.77	. .	30.164	45.5	41.7		45.5	44
		36	α	Ceti	4	. . . .	35	24	6.6	3.2	4.0	3.4	8.0	13.5	6.45	. .		45.5	40.5		45.0	44
		37	α	Persei	4	. . . .	349	35	12.5	8.3	12.4	10.0	14.3	19.3	12.80	. .	30.176	45.3	39.7			
		38		Moon, S. L.	4	. . . .	20	7	48.6	44.3	47.2	44.3	49.6	54.4	48.07*d*	. .	30.150	44.0	37.5			
		39	α	Aurigæ	4	. . . .	353	3	41.0	38.0	39.3	37.3	40.8	49.0	40.90	. .	30.180	43.0	37.0		41.5	42.
		40	β	Tauri	4	. . . .	10	25	15.0	12.0	13.4	13.2	17.0	20.6	15.20	. .			36.5			
		41	δ	Orionis	4	. . . .	39	18	8.6	5.7	6.0	5.0	10.3	15.4	8.50	. .						
		42	α	Columbæ	4	. . . .	73	0	19.4	17.4	16.2	18.3	20.0	27.4	19.78	. .	30.126	42.0	34.8		41.5	41.
		43	α	Orionis	4	. . . .	31	30	50.0	47.0	48.3	47.0	51.2	57.0	50.08	. .	30.124	41.8	35.4		41.5	41.
		44			6	— 8 41.3	305	30	52.3	47.3	49.8	49.2	52.6	58.4	51.60	. .	30.124	41.5	35.0		41.5	41.
		45			5	4 23.3			45.2	39.7	42.0	42.3	43.4	51.5	44.02	. .						
		46	δ	Ursæ Minoris, S. P. . .	4	— 0 3.3			42.7	37.0	39.6	40.0	40.4	49.6	41.55	. .						
		47			3	+ 4 14.7			45.0	39.5	42.0	42.3	43.4	51.8	44.00	. .	30 116	41.0	36.0			
		†48		Bessel's Zone, 511 . .	4	. . . .	354	58	21.7	20.0	20.0	18.3	21.7	29.4	21.85	. .	30.112	41.0	35.0			
		†49		Bessel's Zone, 511, (Mic.)	4	. . . .	"	"	"	"	"	"	"	"	"	34.185						
		†50		Bessel's Zone, 511, (Mic.)	4	. . . .	"	"	"	"	"	"	"	"	"	25.336						
		†51		Bessel's Zone, 516 . .	4	. . . .	355	48	4.0	2.7	2.7	2.6	6.4	11.5	4.98	. .	30.112	41.0	35.0			
		52		Bessel's Zone, 511, (Mic.)	4	. . . .	"	"	"	"	"	"	"	"	"	22.865						

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Feb. 3, 2*h*.	30.047	62.83	Mars .	14	0 3.84
			Jupiter .	17	0 19.18
" 24, 2*h*.	30.050		Sun .	24	16 14.99

Feb. 3. Error of Runs — 0″.11. Temp. of circle 43°; of stone 43°
Feb. 4. do. do. .03. do. do. 43°; do. 43°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 3.18	+ 0 7.08	6 40 40.88	61.65	+ 32 13 0.02	—18.88	C.
0.04	0 7.08	6 40 37.14		+ 32 13 3.16	18.88	
0.20	0 39.65	33 16 59.63		+ 5 36 41.27	—21.58	
0.05	+ 0 10.59	38 56 34.31	62.00	— 0 2 53.06		P.
0.05	— 0 46.20	322 6 58.75		+ 76 46 42.50	+61.35	
0.07	0 17.92	343 11 53.22		+ 55 41 48.03	63.18	
43.75	1 9.36	310 24 0.41		+ 88 29 40.80	54.91	
19.06	.41	.37				
4.65	.47	.56				
0.00	.48	.30				
5.12	.45	.35				
20.01	.43	.50				
44.93	— 1 9.41	.65				
-0 0.01	+ 0 28.35	27 39 16.09		+ 11 14 25.16		
-0 7.66	.34					
0.00	0 17.16	16 9 41.89		+ 22 43 59.36	64.38	
-0 0.05	0 29.68	27 12 29.58		+ 11 41 11.67		
-0 38.27	.64					
-0 0.05	0 43.53	36 18 42.75		+ 2 34 58.50	65.52	
0.07	+ 0 42.13	35 24 49.00		+ 3 28 52.25	61.88	
0.00	— 0 10.92	349 35 2.23		+ 49 18 39.02	42.55	
-0 0.04	—35 13.97	21 11 39.84		+ 17 42 1.41		
-0 0.07	+ 0 0.26	0 15 6.87	62.04	+ 38 38 34.42	15.98	
49.64	1 18.56	55 4 12.36		— 16 10 31.07		
-0 0.01	1 16.91					
-0 0.01	+ 0 9.50	38 39 45.91		+ 0 13 55.39		
0.05	— 0 45.98	322 6 57.58		+ 76 46 43.71	61.59	
0.00	0 17.87	343 11 53.93	61.90	+ 55 41 47.22	63.37	
44.39	1 9.45	310 24 0.89		+ 88 29 40.07	55.02	
19.68	.40	1.36				
4.69	.35	1.07				
0.00	.31	0.95				
4.95	— 1 9.27	1.11				
0.01	+ 0 11.65	27 9 43.34		+ 11 43 57.81		
0.10	0 43.73	36 18 42.60		+ 2 34 58.55	65.58	
0.02	+ 0 42.42	35 24 48.89		+ 3 28 52.26	61.94	
0.00	— 0 10.75	349 35 2.05	61.76	+ 49 18 38.96	42.57	
-0 0.05	33 22.46	19 34 25.66		+ 19 19 15.35		
0.00	— 0 7.33	353 3 33.57		+ 45 50 7.44	14.55	
0.00	+ 0 11.09	10 25 26.29		+ 28 28 14.72	17.31	
-0 0.01	0 49.28	39 18 57.77		— 0 25 16.76	23.98	
⊦0 0.01	3 15.03	73 3 34.82		— 34 9 53.81	28.32	
⊦0 0.02	+ 0 36.93	31 31 27.03		+ 7 22 13.98	15.01	
-0 8.62	— 1 24.30	305 29 18.68		+ 86 35 36.83	+12.33	
-0 2.23	.25	17.54				
⊦0 0.01	.19	17.37				
-0 2.08	1 24.14	17.78				
0.04	0 5.31	354 58 16.50		+ 43 55 24.51	— 8.79	
-4 19.72	0 5.41	354 53 56.72		+ 43 59 44.29	8.64	
⊦4 56.14	0 5.22	355 3 12.77		+ 43 50 28.24	9.44	
-0 0.06	0 4.43	355 48 0.49		+ 43 5 40.52	13.39	
⊦7 31.31	— 0 4.40	355 55 31.89		+ 42 58 9.12	—13.54	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
February 3.		0*h*.					
179° 59′	61″6	57″7	60″5	59″7	60″6	69″2	61″55
	60.3	60.5	62.6	59.4	64.8	67.2	62.47
	61.3	59.6	61.5	59.7	63.0	68.4	62.25
P.	61.3	59.6	61.0	59.7	64.0	68.0	62.26
	61.3	59.6	61.0	59.7	63.5	68.0	62.18
	61.0	59.6	61.0	59.7	63.0	68.0	62.05
Means	61.13	59.43	61.27	59.65	63.15	68.13	62.127 —.133
February 4.		22*h*.					
179 59	61.6	59.3	60.2	59.4	61.8	69.7	62.00
	60.0	61.0	61.3	58.3	65.0	67.5	62.18
	61.7	60.5	61.3	59.5	64.0	69.4	62.73
P.	60.3	60.2	61.0	58.5	64.0	68.6	62.10
	60.3	60.2	61.0	58.5	63.6	68.3	61.98
	60.3	60.2	61.0	58.5	64.0	68.3	62.05
Means	60.70	60.23	60.97	58.78	63.73	68.63	62.173 —.133
February 4.		12*h*.					
179 59	59.5	59.7	60.4	59.5	63.4	66.4	61.48
	60.0	59.7	60.4	60.0	63.4	66.4	61.65
P.	60.0	59.7	60.4	60.0	63.4	66.4	61.65
	60.0	59.7	60.4	60.0	63.4	66.4	61.65
Means	59.87	59.70	60.40	59.89	63.40	66.40	61.612 —.133

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
3, No. 1	42.0	45.0	43.0
4, " 1	42.5	47.0	44.0
" 2	43.0	40.0	40.0

Feb. 3 and 4. Observed often through clouds.
7 to 13. Hazy.
17, 18, 22. Limbs poorly defined.
29 to 33. Hour angles doubtful: observed through clouds.
49. Transit not noted; by obs'n of March 11, 49 precedes 48.
48. Apparent R. A. 6*h*. 38*m*. 19*s*.
50. " " 6 40 49.5.
51. " " 6 56 6.
Nadir point, Feb. 4, No. 2, apparent error of collimation East.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMETE At.	Ext.	St.	Up.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
Feb. 4	1	Anonymous	4	. . .	356 56 16.0	13.3	15.0	15.0	17.5	25.0	16.97	. .	30.100	40.5	34.7		40.0
	2	(14473) Lalande . . .	4	. . .	357 44 21.0	19.0	19.5	19.7	20.3	29.0	21.42	. .					
	3	Bessel's Z., 452–492, (Mic.)	4	. . .	“ “ “	“	“	“	“	“	“	31.295					
	4	Bessel's Z., 452–492, (Mic.)	4	. . .	“ “ “	“	“	“	“	“	“	27.882					
	5	Anonymous	4	. . .	0 42 31.7	29.5	29.8	29.5	31.5	38.5	31.75*d*	. .					
	6	Anonymous, (Mic.) . .	4	. . .	“ “ “	“	“	“	“	“	“	33.085					
	†7	Bessel's Z., 350 . . .	4	. . .	8 21 5.4	4.0	4.2	5.6	7.8	12.0	6.50	. .	30.080	39.5	35.4		
	8	Anonymous, (Mic.) . .	4	. . .	“ “ “	“	“	“	“	“	“	30.510					
	9	ε Hydræ	4	. . .	31 54 29.0	28.0	27.0	27.2	28.5	36.6	29.38	. .	30.082	39.4	35.4		39.5
	†10	Bessel's Z., 344–345 . .	4	. . .	14 20 12.0	8.8	10.0	10.0	13.0	18.0	11.97	. .		39.3	35.5		
	11	α Hydræ	4	. . .	46 52 29.4	26.0	26.6	26.6	28.4	36.3	28.84*d*	. .	30.078	39.5	35.8		
	12	ε Leonis	4	. . .	14 24 51.2	49.8	49.5	50.0	51.6	57.2	51.55	. .	30.076	39.3	35.4		39.5
	13	α Leonis	4	. . .	26 10 23.6	22.5	22.0	22.6	23.0	30.5	24.03	. .	30.018	39.0	35.0		39.0
	14	α Ursæ Majoris	4	. . .	336 19 34.5	34.2	35.4	31.4	36.5	41.0	35.50	. .	30.048	39.0	34.0		
	15	δ Leonis	4	. . .	17 31 37.7	35.5	37.4	36.6	36.6	43.6	37.90	. .	30.044	39.0	33.6		
	16	δ Hydræ et Crateris . .	4	. . .	52 49 16.3	15.3	16.0	16.6	16.7	24.7	17.60	. .					
	17	γ Ursæ Majoris	4	. . .	344 21 14.4	12.0	14.0	12.7	18.0	21.3	15.40	. .	30.028	38.3	33.0		38.0
	18	β Corvi	4	. . .	61 24 33.4	33.0	33.0	32.5	33.5	41.0	34.40	. .	30.006	38.0	32.5		
	†19	α Cassiopeiæ, S. P. . . .	4	. . .	274 46 1.0	0.0	1.7	2.4	4.6	9.3	3.17	. .	30.006	38.0	32.5		
	20	Polaris, S. P.	6	−19 32.7	307 24 60.0	56.4	59.0	57.0	61.2	67.3	60.15	. .	30.006	38.0	32.5	43.0	37.3
	21		5	9 52.7	44.5	41.0	43.6	41.6	43.3	51.7	44.28	. .					
	22		4	− 0 4.7	38.5	36.0	38.3	36.3	37.4	46.6	38.85	. .	30.004	38.0	32.5		
	23		3	+ 9 33.3	43.0	40.0	42.4	40.0	42.2	50.0	42.93	. .					
	24		2	19 28.3	58.0	56.3	58.0	55.7	61.5	64.6	59.02	. .					
	25		1	+29 15.3	25 22.7	21.0	22.5	20.0	23.5	29.7	23.23	. .	29.994	37.7	32.5		
9	26	α Persei	4	. . .	349 35 9.8	7.7	11.6	10.7	12.3	15.4	11.25	. .	30.058	35.0	29.0	40.0	36.0
	27	Weisse III, 878 . . .	4	. . .	24 7 3.0	1.3	2.4	3.0	5.5	9.7	4.15	27.380	30.074	34.0	27.5		
	28	Anonymous, (Mic.) . .	4	. . .	“ “ “	“	“	“	“	“	“	22.695					
	29	1089 Rümker, (Mic.) . .	4	. . .	“ “ “	“	“	“	“	“	“	28.697					
	30	Weisse IV, 286, (Mic.)	4	. . .	“ “ “	“	“	“	“	“	“	25.445					
	†31	α Aurigæ	4	. . .	353 3 35.7	36.2	38.0	35.7	37.2	43.0	37.63	. .	30.082	33.0	26.5		
	32	α Lyræ	4	. . .	0 15 6.0	6.5	6.7	7.0	10.0	12.5	8.12	. .	30.270	31.0	30.0	38.0	30.3
	†33	Mercury	4	. . .	59 29 55.6	56.0	56.4	57.0	60.7	65.0	58.47	. .	30.248	34.1	33.6		
10	†34	Sun, S. L. (Mic.) . . .	1	− 0 48.0	53 29 60.0	60.4	59.3	60.0	62.8	67.3	61.63	33.460	30.214	35.0	36.0		38.
	†35	Sun, N. L.	4	. . .	52 53 59.3	59.0	59.4	60.3	61.5	66.4	60.98	. .					
	36	Venus, S. L.	4	. . .	37 17 6.0	4.7	5.0	5.0	9.2	11.7	6.93*d*	. .	30.154	37.0	38.3		39.
	37	γ Cephei	4	. . .	322 7 44.8	42.7	46.0	42.5	46.6	51.9	45.75*d*	. .	30.144	37.8	38.7		39.
	38	α Cassiopeiæ	4	. . .	343 12 10.5	9.5	12.5	8.0	15.3	18.0	12.30	. .	30.108	39.0	39.0		
	39	Polaris	2	−19 17.4	310 24 49.7	50.0	52.0	45.5	54.4	55.4	51.17	. .	30.108	39.0	39.0		40.
	40		3	− 9 27.4	25 4.3	4.0	6.3	0.3	10.0	10.3	5.87	. .					
	41		4	+ 0 17.6	9.5	8.6	11.3	5.0	13.5	15.5	10.57	. .					
	42		5	9 56.6	4.5	3.0	6.4	0.4	9.5	10.4	5.70	. .					
	43		6	+19 35.6	24 50.0	47.0	51.4	45.0	52.4	56.6	50.40	. .	30.100	39.0	39.0		
11	44	α Lyræ	4	. . .	0 15 6.7	6.3	7.6	6.6	11.2	14.7	8.85	. .	30.070	36.0	33.6	40.0	38.
	45	Mercury	4	. . .	58 51 15.0	14.4	14.4	13.6	18.7	25.0	16.85	. .	30.124	38.0	35.7		39.
12	46	Sun, S. L., (Mic.) . .	1	− 0 47.0	52 50 3.0	1.7	1.8	2.0	6.0	10.5	4.17	32.977	30.126	39.0	37.5		40.
	†47	Sun, N. L.	7	+ 0 50.0	52 14 34.0	34.5	34.3	33.0	35.5	43.6	35.82	. .					
	48	Venus, S. L.	4	. . .	36 57 37.7	36.9	37.4	35.0	39.1	44.2	38.39*d*	. .	30.128	40.0	37.3		40.
	49	Polaris, (Mic.) . . .	3	− 9 23.7	310 24 26.3	25.3	25.8	20.7	27.0	33.3	26.40	29.423	30.136	40.0	37.0		39.
	50			8 23.7								.405					
	51			7 23.7								.398					
	52			6 23.7								.374					

DATE.	MICROMETER. Coincid.	Val. 1r.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Feb. 9, 4*h*.	30.063	62.83			
“ 10, 22*h*.	30.055		Sun .	34	16 14.13
“ 12, 22*h*.	30.052		Sun .	46	16 12.80

Feb. 9 to 12. Error of Runs —0″.18. Temp. of circle and stone 40°.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

RECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
ment.	Objects.		359° 59′		1850.0	
″	′ ″	° ′ ″	″	° ′ ″	″	
0.05	— 0 3.23	356 56 13.79	61.62	+ 41 57 27.08	—17.08	P.
0.03	0 2.38	357 44 19.01		+ 41 9 21.86	19.22	
8.07	0 2.34	357 43 1.01		+ 41 10 39.86	21.06	
6.12	— 0 2.41	357 46 35.13		+ 41 7 5.74	21.06	
0.05	+ 0 0.74	0 42 32.54		+ 38 11 8.33	24.33	
0.70	0 0.68	0 39 21.73		+ 38 14 19.14	25.13	
0.06	0 8.84	8 21 15.40		+ 30 32 25.47	34.32	
8.78	0 8.83	8 20 46.55		+ 30 32 54.32	34.81	
0.02	0 37.46	31 55 6.82		+ 6 58 34.05	35.89	
0.00	0 15.39	14 20 27.36		+ 24 33 13.51	39.15	
0.05	1 4.11	46 53 33.00		— 7 59 52.13	45.98	
0.00	0 15.46	14 25 7.01	61.48	+ 24 28 33.72	48.72	
0.02	+ 0 29.54	26 10 53.59		+ 12 42 47.14	52.96	
0.02	— 0 26.42	336 19 9.06		+ 62 34 31.67	57.22	
0.09	+ 0 19.05	17 31 57.04		+ 21 21 43.69	60.74	
0.04	+ 1 19.54	52 50 37.10		— 13 56 56.37	66.26	
0.07	— 0 16.90	344 20 58.57		+ 54 32 42.16	58.40	
0.02	+ 1 50.38	61 26 24.76		— 22 32 44.03	—74.27	
0.07	—10 41.05	274 35 22.19		+ 55 41 41.46	+63.46	
9.69	1 18.78	307 23 21.68		+ 88 29 39.70	55.07	
5.04	.79	20.45				
0.02	.79	20.04				
4.69	.78	19.46				
9.55	.76	20.71				
4.28	1 18.73	20.22				
0.01	— 0 11.20	349 35 0.06	60.83	+ 49 18 40.02	42.57	
8.97	+ 0 27.44	24 10 20.56		+ 14 43 19.52	47.33	
3.15	0 27.54	24 15 14.84		+ 14 38 25.24	46.18	
6.03	0 27.40	24 8 57.58		+ 14 44 42.50	43.85	
0.53	+ 0 27.48	24 12 22.16		+ 14 41 17.92	39.95	
0.14	— 0 7.47	353 3 30.02		+ 45 50 10.06	14.24	
0.07	+ 0 0.27	0 15 9.22	61.04	+ 38 38 31.07	17.35	
0.00	1 37.19	59 31 35.66		— 20 37 55.36		
3.95	1 14.31	53 11 27.86		— 14 17 47.57		
0.02	1 12.78					
0.05	+ 0 4.64	37 17 11.62		+ 1 36 28.67		
0.05	— 0 46.56	322 6 59.24		+ 76 46 41.05	63.00	
.08	0 18.29	343 11 54.09		+ 55 41 46.20	64.56	
.18	1 10.12	310 24 0.23		+ 88 29 39.92	55.81	
.61	.10	.37				
.01	.10	.47				
.08	.10	.68				
.79	— 1 10.10	.09				
.07	+ 0 0.27	0 15 9.05	60.58	+ 38 38 30.78	17.87	
.06	1 33.84	58 52 50.75		— 19 59 10.91		
.06	1 11.97	52 31 59.28		— 13 38 19.45		
.16	1 10.51					
.05	+ 0 3.10	36 57 41.54		+ 1 55 58.29		
.36	— 1 10.45	310 23 59.65				
.64	.45	59.93				
.26	.45	59.55				
.93	.45	60.22				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
February 9.		*2h.,*	*30m.*				
179° 59′	60″0	57″0	60″4	57″7	60″4	66″6	60″35
	59.5	59.5	61.7	58.0	64.0	64.8	61.25
	60.3	58.4	60.8	58.0	61.0	67.7	61.03
P.	59.0	59.6	61.0	57.5	62.7	65.7	60.92
	60.3	58.3	60.0	59.5	61.0	67.7	61.13
	59.0	59.6	61.5	58.0	63.3	65.0	61.07
Means	59.68	58.73	60.90	58.12	62.07	66.25	60.958 —.133
February 10.		*22h.*					
179 59	59.8	60.0	60.3	59.4	61.3	67.7	61.42
	57.6	61.3	60.3	58.0	64.0	64.5	60.95
	59.2	60.2	60.3	60.0	61.6	66.6	61.32
P.	58.4	61.3	60.6	58.4	63.0	64.4	61.02
	59.0	60.4	60.0	60.0	61.3	66.6	61.22
	59.0	60.2	60.0	59.5	61.7	66.3	61.12
Means	58.83	60.57	60.25	59.22	62.15	66.02	61.173 —.133
February 12.		*22h.*					
179 59	58.6	57.8	58.5	57.0	61.4	67.0	60.05
	58.2	60.5	60.0	56.6	64.5	65.2	60.83
	58.6	59.8	59.6	57.5	63.5	66.2	60.87
P.	58.6	59.8	59.6	57.5	63.5	66.2	60.87
	58.6	59.8	59.6	57.5	63.5	66.2	60.87
	58.6	59.8	59.2	57.5	63.5	66.2	60.80
Means	58.53	59.58	59.42	57.27	63.32	66.17	60.715 —.133

THERMOMETERS.

OINTS.	Stone.	Upper.	Lower.
	°	°	°
No. 1	40.0	37.5	37.0
" 1	38.0	38.0	38.0
" 1	41.0	41.0	41.0

		H.	M.	S.
1.	App. R. A.	7	10	56
2.	"	7	19	39
3.	"	7	27	48
4.	"	7	27	49
5.	"	7	41	33
6.	"	7	44	42
7.	"	8	26	37
8.	"	8	28	47
10.	"	8	49	49
27.	"	3	45	11.5
28.	"	3	49	57.5
29.	"	3	59	1.5
30.	"	4	14	3

19. Much diffused.
31. Very unsteady ; Dec. differs nearly 3″ from the mean of other observations.
33. Very faint.
34, 35. Limbs very poorly defined.
47. Observed after passing wire. Observation unsatisfactory.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMETI			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	
Feb. 12	1			— 5 23.7								29.370					
	2			4 23.7								.360					
	3			3 23.7								.346					
	4			2 23.7								.340					
	5	Polaris, (Mic.) . . .		— 1 23.7								.333					
	6		4	+ 0 24.3								.327					
	7			1 36.3								.334					
	8			2 36.4								.340					
	9			3 36.3								.348					
	10			4 36.3								.353					
	11			5 36.3								.360					
	12			6 36.3								.368					
	13*		5	+10 10.3	310 24 25.0	23.4	24.5	20.5	25.4	31.6	25.07	.423					
	14	Mars	6	. . .	25 30 13.3	11.7	11.0	11.4	14.0	19.4	13.47	. .	30.144	39.0	36.6		3
	†15	Jupiter, S. L.	4	. . .	26 45 34.4	34.5	32.7	32.5	33.8	41.6	34.92	. .	30.144	39.0	36.6		3
	16	Jupiter, N. L. (Mic.) .	4	. . .	" " "	"	"	"	"	"	"	30.630					
	†17	γ Ceti	4	. . .	36 17 56.4	55.0	55.7	54.0	58.5	63.0	57.10	. .		38.5	35.7		
	18	α Ceti	4	. . .	35 24 4.0	2.0	2.4	1.4	5.7	11.3	4.47	. .	30.150	38.0	35.0		3
	19	α Persei	4	. . .	349 35 10.8	8.4	12.0	9.8	13.7	16.0	11.78	. .		38.0	34.5		[illegible]
	20	Weisse III, 878, (Mic.) .	4	. . .	24 7 3.0	0.5	0.5	1.0	4.5	9.3	3.13	27.373					
	21	1089 Rümker, (Mic.) . .	4	. . .	" " "	"	"	"	"	"	"	28.673					
	22	Weisse IV, 24, (Mic.) .	4	. . .	" " "	"	"	"	"	"	"	33.360					
	23	Tauri, 1332, (Mic.) . .	4	. . .	" " "	"	"	"	"	"	"	27.145					
	24	Weisse IV, 286, (Mic.) .	4	. . .	" " "	"	"	"	"	"	"	25.323					
	25	Anonymous, (Mic.) . .	4	. . .	" " "	"	"	"	"	"	"	29.260					
	26	Tauri, 1395, (Mic.) . .	4	. . .	" " "	"	"	"	"	"	"	29.813					
	27	Weisse IV, 533, (Mic.) .	4	. . .	" " "	"	"	"	"	"	"	33.690					
13	†28	Sun, S. L. (Mic) . . .	1	— 0 47.0	52 30 3.0	2.5	2.0	3.0	6.4	11.0	4.65	33.112	30.264	37.0	36.6	39.0	39.5
	†29	Sun, N. L.	4	. . .	51 54 22.8	23.4	22.0	22.0	25.3	30.6	24.35	. .					
	†30	Venus, S. L.	4	. . .	36 49 36.0	34.7	34.8	33.4	36.4	42.0	36.22	. .	30.216	38.0	36.6		40.0
17	31	Sun, S. L. (Mic.) . .	1	— 0 47.0	51 5 3.0	3.6	3.0	2.3	7.4	10.3	4.93	30.630	30.090	38.5	44.4	38.0	42.0
	32	Sun, N. L.	4	. . .	50 31 58.7	58.0	58.7	58.7	63.3	57.0	60.73	. .					
	33	Venus, S. L.	4	. . .	36 29 44.5	43.0	43.7	41.5	46.0	50.6	44.88	. .	30.070	40.3	46.5		45.5
	34		3	— 9 11.2	310 24 55.4	52.3	56.0	49.5	58.0	61.5	55.45	29.855	30.080	44.3	46.7		45.0
	35			7 11.2								.840					
	36			5 11.2								.813					
	37			3 11.2								.796					
	38			1 11.2								.790					
	39	Polaris, (Mic.) . . .	4	+ 0 32.8								.786					
	40			2 32.8								.792					
	41			4 32.8								.800					
	42			6 32.8								.814					
	43			8 32.8								.844					
	44		5	+10 20.8								.857		44.7	46.2		
	45	Jupiter, S. L.	4	. . .	26 29 24.5	23.4	22.3	20.4	25.5	30.0	24.35	. .	30.080	44.7	45.0		45.
	46	Jupiter, N. L. (Mic.) .	4	. . .	" " "	"	"	"	"	"	"	30.636					
	†47	Mercury	4	. . .	56 22 23.7	23.1	22.0	22.7	24.1	32.3	24.65d	. .	30.248	37.0	37.3	40.0	38.
18	48	Sun, S. L.	4	. . .	50 43 12.0	14.2	13.2	11.4	15.8	20.7	14.55	. .	30.242	38.3	37.0		41.
	49	Venus, S. L.	7	. . .	36 27 58.5	56.8	56.2	56.8	60.5	64.9	58.95	. .	30.230	40.0	36.8		41.
	50	α Andromedæ	4	. . .	10 38 55.5	56.5	56.0	56.0	61.3	62.5	57.97	. .	30.226	39.5	37.5		
	51	α Cassiopeiæ	4	. . .	343 12 13.5	11.8	14.2	10.8	16.7	21.5	14.76d	. .	30.232	39.5	37.5		
	52	Polaris, (Mic.) . . .	3	— 9 10.2	310 25 22.2	21.7	22.5	28.6	24.3	30.0	24.88	30.284	30.232	39.5	37.5		40.

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 r.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Feb. 12,		62.83	Jupiter .	15	0 18.16
" 13, 22h.	30.054		Sun . .	28	16 14.72
" 17, 23h.	30.050		Sun . .	31	16 14.41
			Jupiter .	45	0 18.39
" 18, 1h.	30.055				

Feb. 13. } Error of Runs —0″.18. Temp. of circle and stone 40°
Feb. 17. }
Feb. 18. do. do. .12. do. do. do. 40°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
Instrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
+0 44.57	— 1 10.45	310 23 59.86				P.
44.69	.45	59.98				
45.18	.45	60.47				
45.25	.45	60.54				
45.43	.45	60.72	60.58	+ 88 29 39.54	+56.18	
45.72	.45	61.01				
45.40	.45	60.69				
45.24	.45	60.53				
45.00	.45	60.19				
45.10	.45	60.29				
45.18	.45	60.47				
45.32	.45	60.61				
44.88	— 1 10.45	60.17				
0.01	+ 0 26.33	25 30 39.81		+ 13 23 1.02		
+0 0.02	0 29.60	26 45 46.38		+ 12 7 53.46		
—0 36.28	.58					
0.08	0 44.24	36 18 41.26		+ 2 34 58.57	65.98	
—0 0.04	+ 0 42.88	35 24 47.31		+ 3 28 52.52	62.37	
+0 0.01	— 0 11.12	349 35 0.67		+ 49 18 39.16	42.89	
2 48.65	+ 0 27.11	24 10 18.89		+ 14 43 20.94	47.48	
+1 25.59	27.08	24 8 55.80		+ 14 44 44.03	43.99	
—3 27.51	26.98	24 4 2.60		+ 14 49 37.23	43.20	
+3 2.85	27.11	24 10 33.09		+ 14 43 6.74	40.63	
4 57.45	27.15	24 12 27.73		+ 14 41 12.10	40.06	
0 50.09	27.07	24 8 20.29		+ 14 45 19.54	38.54	
+0 15.09	27.05	24 7 45.27		+ 14 45 54.56	37.85	
—3 48.53	26.97	24 3 41.57		+ 14 49 58.26	37.00	
3 12.34	+ 1 11.57	52 11 49.16	60.51	— 13 18 9.40		
0 0.02	1 10.11					
0.01	0 2.56	36 49 38.77		+ 2 4 1.00		
—0 36.69	1 6.37	50 49 20.20	62.19	— 11 55 38.76		
+0 0.04	+ 1 5.03					
0.02	— 0 1.07	36 29 43.83		+ 2 23 57.61		
+0 16.66	1 8.96	310 24 3.15				
15.92	8.97	2.40				
16.27	8.97	2.75				
16.48	8.98	2.95				
16.41	8.99	2.87				
16.55	8.99	3.01		+ 88 29 38.40	57.31	
16.49	9.00	2.94				
16.65	9.01	3.09				
16.91	9.02	3.34				
16.59	9.03	3.01				
17.45	— 1 9.03	3.87				
+0 0.01	+ 0 28.68	26 29 34.65		+ 12 24 6.80		
—0 36.75	.66					
+0 0.05	+ 1 25.20	56 23 49.90	62.03	— 17 30 8.61		
0.00	—15 4.73	50 28 9.82		— 11 34 28.54		
+0 0.27	— 0 0.51	36 27 58.71		+ 2 25 42.57		
—0 0.01	+ 0 11.32	10 39 9.29		+ 28 14 31.59	73.30	
+0 0.05	— 0 18.18	343 11 56.63		+ 55 41 44.65	+66.34	
—0 9.97	— 1 10.61	310 24 4.16				

NADIR POINTS—READINGS.							
	A.	B.	C.	D.	E.	F.	Means.
February 13.		22*h*.					
179° 59′	59″0	58″7	58″6	58″0	61″4	66″3	60″33
	58.0	60.8	60.0	57.0	63.8	64.3	60.65
	58.8	59.5	59.2	58.0	62.2	65.7	60.57
P.	58.5	60.0	59.4	58.0	63.2	65.3	60.73
	58.5	60.0	59.4	58.0	63.5	65.3	60.78
	58.5	60.0	59.4	58.0	63.5	65.3	60.78
Means	58.55	59.83	59.33	57.83	62.93	65.37	60.640 —.132
February 17.		22*h*.,	30*m*.				
179 59	60.8	60.0	60.3	59.7	62.6	69.0	62.07
	60.0	61.7	60.8	59.3	65.4	67.3	62.42
	60.5	60.3	60.0	60.0	63.2	69.0	62.17
P.	59.2	61.8	61.5	59.3	66.3	66.5	62.43
	60.4	60.5	60.0	60.0	63.5	68.8	62.20
	60.0	61.7	60.8	59.7	65.7	67.8	62.62
Means	60.15	61.00	60.57	59.67	64.45	68.07	62.318 —.132
February 18.		22*h*.,	30*m*.				
179 59	60.8	60.8	60.3	61.6	61.5	69.7	62.45
	59.7	61.7	61.0	59.8	63.5	66.6	62.05
	59.7	61.2	60.2	59.8	62.7	67.3	61.82
P.	60.0	61.5	60.5	59.8	63.4	67.7	62.15
	60.0	61.5	60.5	59.8	64.0	67.7	62.25
	60.0	61.5	60.5	59.8	64.0	67.7	62.25
Means	60.03	61.37	60.50	60.10	63.18	67.78	62.162 —.132

THERMOMETERS.			
DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
13, No. 1	39.0	40.0	38.5
17, " 1	38.0	43.0	39.0
18, " 1	40.0	42.0	40.0

		H. M. S.	
20.	App. R. A.,	3 45 11	
21.	"	3 59 1.5	
22.	"	4 2 1	
23.	"	4 11 55	(7 mag.)
24.	"	4 14 2.5	(8 mag.)
25.	"	4 19 39	
26.	"	4 22 25	
27.	"	4 25 15	

15 to 17, 47. Faint.
28, 29. Limbs poorly defined.
30. Very unsteady.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMETERS				
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.	L
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°	
Feb. 18	1	Polaris, (Mic.) . . .	4	— 7 10.2								30.250						
	2			5 10.2								.227						
	3			3 10.2								.206						
	4			— 1 10.2								.206						
	5			+ 0 31.8								.208						
	6			2 31.8								.213						
	7			4 31.8								.228						
	8			6 31.8								.236						
	9			8 31.8								.255						
	10		5	+10 31.8	310 25 22.0	21.4	22.5	28.6	23.6	29.5	24.60	.286	30.240	39.2	36.0			
	11	Mars	4	. . .	24 8 44.0	44.0	44.2	43.0	45.7	50.5	45.23	. .	30.240	38.0	35.0	40.0	37.5	38
	12	α Persei	4	. . .	349 35 12.5	11.7	13.4	11.3	14.5	20.0	13.90	. .	30.258	37.5	33.2		38.0	38
	13	η Tauri	4	. . .	15 15 55.2	54.2	54.2	54.2	57.8	60.3	55.98	. .	30.258	37.5	32.2			
	14	γ¹ Eridani	4	. . .	52 49 32.6	32.2	33.0	32.6	33.0	39.0	33.73	. .	30.264	37.0	32.0		36.5	37
	15	α Tauri	4	. . .	22 41 36.2	35.2	35.0	35.7	36.8	44.5	37.23	. .	30.276	36.5	30.6		35.0	36
	16	Anonymous, (Mic.) . .	5	. . .	” ” ”	”	”	”	”	”	”	29.550						
	17	Bessel's Zone, 513 . .	4	. . .	9 17 51.8	51.4	51.6	52.0	54.4	58.0	53.20	. .	30.252	36.0	29.2			
	18	Bessel's Zone, 398, (Mic.)	4	. . .	“ “ “	“	“	“	“	“	“	36.553						
	19	Bessel's Zone, 513 . .	4	. . .	9 7 28.8	28.8	27.0	28.0	29.1	33.9	29.27*d*	. .	30.270	35.0	27.8			
	20	κ Aurigæ, 2001	4	. . .	9 20 38.7	38.3	38.7	39.8	40.3	43.8	39.92	. .	30.270	35.0	27.3		35.0	35
	21	55 Aurigæ, 2182	4	. . .	354 13 51.4	52.0	52.0	52.2	55.5	58.0	53.52	. .	30.276	34.0	26.5		35.5	35
	22	Bessel's Zone, 511, (Mic.)	4	. . .	“ “ “	“	“	“	“	“	“	29.303						
	23	Bessel's Zone, 492 . .	4	. . .	357 18 7.0	7.0	6.5	8.5	10.5	14.0	8.92	. .	30.290	34.0	25.5			
	24	Bessel's Zone, 492, (Mic.)	4	. . .	“ “ “	“	“	“	“	“	“	33.286						
	25	Bessel's Zone, 492 . .	4	. . .	357 6 6.3	5.4	5.6	8.3	9.0	13.3	7.98	. .			25.0			
21	26	Sun, N. L. (Mic.) . .	4	. . .	49 7 2.1	3.3	0.9	2.1	6.9	10.9	4.37*d*	30.561	29.678	39.8	43.2			
	27	Sun, S. L.	6	+ 0 31.0	49 38 52.8	53.8	51.8	52.9	56.1	61.3	54.78	. .				36.8	40.0	38
22	†28	Mercury, S. L.	4	. . .	53 40 11.8	14.5	10.8	13.4	15.0	20.3	14.30	. .	30.006	35.1	35.6	36.7	37.7	35
	29	Mercury, N. L. (Mic.) .	4	. . .	“ “ “	“	“	“	“	“	“	30.166						
23	30	Sun, N. L. (Mic.) . .	3	— 0 15.7	48 22 45.8	47.1	46.0	47.0	50.7	52.8	48.23*d*	30.129			37.5		37.5	35
	31	Sun, S. L.	5	+ 0 16.3	48 55 5.0	8.1	5.0	8.3	10.1	15.0	8.58	. .	29.992	35.8			37.7	36
	32	Venus, S. L.	4	. . .	36 39 7.1	7.8	7.6	6.7	11.1	14.2	9.08	. .	29.986	36.2	37.4		37.5	36
	33	Venus, E. Cusp. (Mic.) .	4	. . .	“ “ “	“	“	“	“	“	“	30.280						
	34	Venus, W. Cusp. (Mic.)	4	. . .	“ “ “	“	“	“	“	“	“	30.744						
	†35	α Cassiopeiæ	4	. . .	343 12 15.0	13.5	15.2	13.5	17.2	23.5	16.32*d*	. .	29.948	38.0	37.5		40.7	37
	36	Polaris	3	— 9 20.7	310 25 8.1	7.9	7.9	6.8	11.1	15.2	9.50	. .	20.940	38.0	37.3	36.5	38.4	37
	37		4	4 50.7	11.0	11.5	10.3	9.8	14.0	18.4	12.50	. .						
	38			+ 0 20.3	12.1	13.0	12.0	10.8	14.5	20.0	13.73	. .			37.3		39.2	37
	39			4 51.3	11.0	11.9	11.1	9.0	13.9	18.8	12.62	. .						
	40		5	+10 8.3	7.8	7.9	7.0	5.9	10.0	14.4	8.83	. .	29.936	38.0	37.5		39.0	37
	41	α Arietis	4	. . .	16 9 25.7	26.1	25.0	24.0	25.6	32.7	26.52	. .	29.950	38.1	37.7		38.1	37
	†42	Jupiter, S. L.	4	. . .	26 8 48.8	50.2	49.1	48.0	51.9	55.1	50.52	. .	29.940	38.0	37.8	36.5	38.4	37
	43	Jupiter, N. L. (Mic.) .	4	. . .	“ “ “	“	“	“	“	“	“	30.616						
	44	α Aurigæ	6	. . .	353 3 38.8	37.9	38.0	38.0	41.0	47.0	40.12	. .					36.5	36
	45	β Tauri	6	. . .	10 25 12.4	13.9	12.0	13.0	22.1	20.1	15.58	. .			33.4		36.5	36
	46	δ Orionis	5	. . .	39 18 9.2	10.0	7.0	9.5	13.2	17.6	11.08	. .	29.974	37.5	33.7		36.5	36
	47	Bessel's Zone, 513, (Mic.)	4	. . .	9 9 55.4	56.4	54.9	55.8	60.4	61.0	57.32	32.419	29.984	37.5	33.8		36.5	36
	†48	Bessel's Zone, 513, (Mic.)	6	. . .	“ “ “	“	“	“	“	“	“	26.710						
	49	κ Aurigæ, 2001, (Mic.) .	5	. . .	9 19 23.4	23.8	23.0	23.1	26.0	29.6	24.82	28.840	29.986	37.0	32.5		35.7	35
	50	δ Ursæ Minoris, S. P. . .	5	— 4 30.3	305 30 39.0	37.1	38.0	36.5	41.5	45.9	39.67	. .	29.984	37.0	32.3		35.6	35
	51		4	0 9.8	37.0	35.3	35.1	36.4	38.0	43.3	37.52	. .						
	52		3	+ 4 48.2	39.6	38.5	39.4	40.0	42.7	46.2	41.07	. .	29.982	37.0	32.9		36.0	

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Feb. 21,		62.83	Sun .	26	16 11.80
“ 22,			Mercury	28	0 3.51
“ 23, 23*h*.	30.053		Sun .	30	16 13.20
			Venus .	32	0 28.74
			Jupiter .	42	0 17.75

Feb. 21. Error of Runs —0″.18. Temp. of circle and stone 40°
Feb. 23. do. .33 do. do. do. 36°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 9.59	—1 10.63	310 24 4.52				
9.43	.65	4.66				
9.02	.67	5.05				
9.46	.69	4.59				
9.72	.72	4.30	62.03	+ 88 29 36.72	+57.53	P.
9.71	.74	4.29				
9.74	.77	4.23				
9.36	.79	4.59				
9.06	.81	4.87				
9.03	—1 10.84	4.87				
-0 0.05	+0 25.00	24 9 10.18		+ 14 44 31.10		
-0 0.01	—0 11.17	349 35 2.74		+ 49 18 38.54	43.26	
-0 0.06	+0 16.63	15 16 12.67		+ 23 37 28.61	46.06	
-0 0.02	1 20.24	52 50 53.95		— 13 57 12.67	55.45	
-0 0.16	0 25.58	22 42 2.97		+ 16 11 38.31	35.58	
-0 31.86	0 10.06	9 18 35.12		+ 29 35 6.16	22.34	
0 0.14	0 10.04	9 18 3.10		+ 29 35 38.18	22.33	
6 48.28	0 9.91	9 11 14.83		+ 29 42 26.45	21.74	
0 0.05	0 9.88	9 7 39.20		+ 29 46 2.08	12.77	
0 0.05	+0 11.13	9 20 51.10		+ 29 32 50.18	+ 3.16	
0 0.09	—0 6.24	354 13 47.09		+ 44 39 54.09	— 8.75	
0 47.22	0 6.23	354 14 34.51		+ 44 39 6.77	9.27	
0 0.15	0 2.90	357 18 5.87		+ 41 35 35.41	18.76	
3 22.96	0 2.96	357 14 43.00		+ 41 38 58.28	19.17	
0 0.09	—0 3.12	357 6 4.95		+ 41 47 36.33	—22.39	
0 31.84	+1 0.88	49 23 45.21	61.50	— 10 30 4.46		C.
0 0.12	1 2.12					
-0 0.01	1 16.49	53 41 27.29	62.37	— 14 47 45.67		
-0 6.96	.44					
-0 4.68	1 0.72	48 39 57.47		— 9 46 15.85		
-0 0.14	+1 1.96					
-0 0.04	—0 2.66	36 39 6.38				
14.11	+0 26.45	6.76		+ 2 14 35.05		
-0 43.43						
-0 0.04	—0 18.01	343 11 58.35		+ 55 41 43.27	+67.53	
4.53	1 9.96	310 24 4.07				
1.23	.96	3.77				
0.01	.95	3.80		+ 88 29 37.67	58.47	
1.22	.94	3.90				
-0 5.32	—1 9.93	4.22				
-0 0.03	+0 17.28	16 9 43.77	61.89	+ 22 43 57.37	66.26	
0.05	+0 28.62	26 9 1.34		+ 12 44 39.80		
-0 35.54	.61					
+0 0.26	—0 7.33	353 3 33.05		+ 45 50 8.09	13.79	
-0 0.02	+0 11.07	10 25 26.63		+ 28 28 14.51	17.14	
+0 0.04	0 49.22	39 19 0.34		— 0 25 19.20	25.17	
-2 28.54	0 9.67	9 7 38.45		+ 29 46 2.69	12.71	
+3 30.17	0 9.78	9 13 37.27		+ 29 40 3.87	10.74	
+1 15.81	+0 9.93	9 20 50.56		+ 29 32 50.10	3.01	
-0 2.31	—1 24.41	305 29 12.95				
+0 0.04	.35	13.21		+ 86 35 32.29	+16.65	
-0 2.64	.30	14.13				

NADIR POINTS—READINGS.

		A.	B.	C.	D.	E.	F.	Means.
February 21.			22*h*.,	30*m*.				
179° 59′		60″9	60″0	58″5	59″3	62″0	68″0	61″45
C.		60.8	60.5	59.0	58.8	63.8	68.0	61.82
Means		60.85	60.25	58.75	59.05	62.90	68.00	61.633 —.133
February 23.			0*h*.					
179 59		59.0	61.7	61.2	60.1	65.0	66.0	62.17
		60.0	62.4	61.8	60.6	65.1	66.9	62.80
		58.8	63.0	61.9	60.8	65.8	66.1	62.73
C.		58.2	62.2	62.0	60.0	65.1	66.0	62.25
		58.6	62.9	61.6	61.0	65.9	66.2	62.70
		58.6	62.0	61.4	60.7	65.1	66.2	62.33
Means		53.87	62.37	61.65	60.53	65.33	66.23	62.497 —.130
February 23.			8*h*.					
179 59		57.4	61.0	59.3	60.0	65.1	65.1	61.32
		58.0	60.3	59.0	60.0	65.0	66.0	61.38
		58.0	60.4	59.1	60.6	64.4	66.4	61.48
C.		58.1	60.2	59.1	60.1	64.4	66.3	61.37
		58.2	60.6	59.7	60.8	64.1	66.8	61.70
		58.8	61.0	59.9	60.4	64.8	67.2	62.02
Means		58.08	60.58	59.35	60.32	64.63	66.30	61.544 —.132
February 23.			12*h*.					
179 59		60.6	61.2	60.0	62.3	64.0	68.4	62.75
		60.6	61.0	60.3	61.0	64.9	67.0	62.47
		58.0	60.1	59.0	60.4	63.5	66.6	61.27
C.		58.9	60.9	59.7	61.0	64.1	67.4	62.00
		58.0	60.2	59.2	60.5	63.9	67.0	61.47
		58.8	60.8	60.1	61.4	64.5	67.0	62.10
Means		59.15	60.70	59.72	61.10	64.15	67.23	62.008 —.131

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
21, No. 1	36.8	42.0	39.0
23, " 1	36.5	40.5	37.0
	. .	40.7	37.0
" 2	36.6	36.4	36.3
" 3	36.7	34.2	34.8
		34.6	35.2

		H. M. S.	
16.	App. R. A.	4 59 53	(9 mag.)
17.	"	4 59 59	(8 ")
18.	"	5 1 54	(9 ")
19.	"	5 32 42	(7.8 ")
20.	"	6 5 37	(3.4 ")
21.	"	6 31 57	(3.4 ")
22.	"	6 33 37	(6 ")
23.	"	7 11 19	(8 ")
24.	"	7 12 48	(8 ")
25.	"	7 24 46	(10 ")
47.	"	5 32 40	(9 ")
48.	"	5 39 30	(9 ")
49.	"	6 5 35	(5 ")

28. Faint; correction for defective illumination, +0″.04.
35. Very steady.
42, 48. Faint; through clouds.
Nadir Point, Feb. 21. Mercury too unsteady.
Nadir Points, Feb. 23. Apparent error of collimation, 10″ East.

					Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMETERS			
							A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.
					No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
				[illegible]	4	. . .	16 37 53.2	53.2	53.2	52.9	57.5	60.4	55.07*d*	. .	29.982	36.5	33.5		36.0
				[illegible]	4	. . .	,, ,, ,,	,,	,,	,,	,,	,,	,,	29.996	29.990	36.3	33.5		35.8
		3		[illegible]	4	. . .	6 40 25.6	25.6	24.9	25.2	27.4	33.2	26.98	. .					
		4		[illegible] Majoris	4	. . .	33 16 18.0	19.3	17.1	18.0	22.0	26.3	20.12	. .					
		5		[illegible]orum	4	. . .	10 30 3.5	3.4	2.6	4.9	8.1	9.4	5.32	. .	29.986	36.1	33.0		35.7
		6		Ursæ Majoris	4	. . .	350 15 29.0	27.0	29.0	29.0	29.0	36.9	29.98	. .	29.986	35.5	31.9	36.7	35.0
		7		Ursæ Majoris	4	. . .	346 31 32.9	30.9	33.1	31.6	33.9	39.7	33.68	. .	29.994	35.5	32.2		35.1
		8		Leonis	4	. . .	26 10 22.4	24.2	21.7	23.0	24.7	29.2	24.20	. .	29.996	35.0	30.8		34.6
		9		Ursæ Majoris	4	. . .	336 19 29.4	29.1	29.0	27.8	31.4	37.0	30.62	. .	29.998	34.7	31.3		34.4
		10		Leonis	4	. . .	17 31 39.4	37.1	37.1	38.0	38.5	44.0	39.02	. .			31.4		
		11		Hydræ et Crateris	4	. . .	52 49 18.9	19.5	19.4	18.8	22.1	26.9	20.93	. .	30.004	34.5	31.5		32.2
		12		Cephei, S. P.	4	. . .	295 42 19.5	20.3	18.7	20.0	24.1	28.4	21.83*d*	. .	30.008	34.5	30.7		33.9
		13		Leonis	4	. . .	23 27 31.5	31.2	29.6	31.2	32.7	39.0	32.53*d*	. .			30.3		33.8
		†14	α	Cassiopeiæ, S. P. (Mic.)	4	. . .	274 46 6.6	7.3	6.8	11.0	11.5	17.4	10.10	30.172	30.016	34.0	28.9	36.7	34.4
		15		Polaris, S. P.	5	−10 9.1	307 24 39.2	42.1	40.9	39.9	44.1	48.0	42.37	. .	30.014	34.0	28.5	36.7	33.4
		16				5 22.1	36.9	37.8	37.0	36.0	39.9	45.0	38.77	. .					
		*17			4	−0 18.1	35.1	36.0	35.0	35.0	37.6	44.0	37.12	. .			28.3		33.5
		18				+4 7.9	35.2	37.0	36.0	35.3	39.0	44.2	37.78	. .					
		19			3	+9 17.9	38.1	41.0	39.6	39.0	44.0	46.8	41.42	. .	30.014	34.0	28.2		33.6
March	2	20		Venus, S. L.	4	. . .	38 0 22.3	20.3	29.0	14.5	28.0	24.3	23.07	. .	30.374	31.0	39.6		33.5
	3	†21		Sun, N. L.	4	. . .	45 21 60.2	60.0	66.4	53.6	69.8	61.0	61.83	. .	30.370	31.7	40.0	30.5	33.5
		22	α	Tauri	4	. . .	22 41 16.4	15.2	19.6	9.8	23.3	20.5	17.47	. .	30.350	34.0	33.0	31.0	33.5
		23	β	Tauri	4	. . .	10 24 52.8	53.0	56.0	49.5	61.8	57.7	55.13	. .	30.344	33.0	29.5		
		24		Bessel's Zone, 513	4	. . .	9 7 9.3	8.0	10.6	4.6	15.4	13.0	10.15	. .	30.344	33.0	29.5		32.5
		†25		Bessel's Zone, 513, (Mic.)	4	. . .	" " "	"	"	"	"	"	"	24.330					
		26	κ	Aurigæ, 2001	4	. . .	9 20 18.2	17.0	21.0	12.7	23.8	22.3	19.17	. .	30.344	32.7	27.0		
		27	δ	Ursæ Minoris, S. P.	4	. . .	305 30 17.0	15.0	19.3	12.0	23.3	21.6	18.03	. .	30.344	32.3	26.7		32.0
		28		Aurigæ, 2182	4	. . .	354 13 30.0	30.2	33.3	24.0	35.4	35.7	31.43	. .	30.344	32.3	26.0		
		†29		Bessel's Zone, 511, (Mic.)	4	. . .	" " "	"	"	"	"	"	"	29.210					
		30	ε	Canis Majoris	4	. . .	67 37 7.3	8.2	12.0	4.8	16.7	14.4	10.57	. .	30.350	32.0	25.6		
		31		Bessel's Zone, 492	4	. . .	357 17 49.0	49.0	53.3	45.0	57.8	53.5	51.27	. .	30.346	31.0	25.5		
		†32		Bessel's Zone, 492, (Mic.)	4	. . .	" " "	"	"	"	"	"	"	33.290					
		33	α	Canis Minoris	4	. . .	33 15 56.3	58.4	59.0	53.7	66.5	62.7	59.43	. .	30.346	31.0	24.6		
		†34	15	Argus	4	. . .	62 43 28.7	30.8	30.4	25.3	34.4	34.3	30.65	. .	30.350	30.0	23.0		28.5
	4	†35		Sun, N. L. (Mic.)	3	−0 17.0	44 59 54.3	55.2	56.7	51.6	62.6	57.9	56.38	30.900	30.220	32.5	40.0		35.0
		†36		Sun, S. L.	5	+0 15.0	45 31 14.2	15.2	17.1	12.0	20.0	19.1	16.27	. .				31.5	36.0
		37		Polaris	3†	−9 24.6	310 24 51.9	49.4	52.9	44.9	58.2	56.9	52.37	. .	30.142	36.3	41.2		38.7
		38				−5 11.6	53.9	52.1	56.0	46.9	62.0	59.0	54.98	. .					
		39				+0 1.4	54.5	54.1	57.5	48.1	64.5	60.1	56.47	. .			41.0		38.7
		40				4 19.4	52.9	52.0	56.4	46.9	61.6	58.1	54.65	. .					
		41			5†	+9 42.4	48.0	47.0	51.9	42.9	55.6	54.0	49.90	. .	30.130	37.0	40.8		38.9
	5	42	α	Andromedæ	. .	. . .	10 38 60.5	60.3	64.0	55.0	71.0	64.7	62.58	. .	29.954	44.7	55.4	35.0	50.5
		43	α	Cassiopeiæ	4	. . .	343 13 16.6	15.5	19.3	9.2	25.1	23.0	18.12*d*	. .	29.950	46.8	56.5		53.0
		44		Polaris, (Mic.)	3	−9 34.7	310 25 16.7	15.0	19.0	8.6	24.0	23.3	17.77	30.058	29.950	48.0	56.6		53.0
		45				7 34.7								.018					
		46				5 34.7								.001					
		47				3 34.7								29.985					
		48				−1 34.7								.980					
		49			4	+0 12.3								.980					
		50				2 12.3								.996					
		51				4 12.3								30.000					
		52				+6 12.3								.016					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Mar. 4, 23*h*.	29.997	62.73	Sun	35	16 10.91?
" 5, 1*h*.	29.931				

Feb. 25. 8 additional wires put in micrometer diaphragm.
Mar. 3. Inclination of wires very great.
Mar. 4. After observations moved telescope more nearly to 0°; adjusted horizontal wire by equatorial stars.

Mar. 3. Error of Runs −0″.30. Temp. of circle 33°; of stone 31°
Mar. 4. do. do. −0″.01 do. do. 35°; do. 31°
Mar. 5. do. do. +0″.55 do. do. 45°; do. 38°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.03	+ 0 17.99	16 38 13.09	61.41	+ 22 15 27.57	—14.06	C.
3.51	0 7.05	6 40 37.54		+ 32 13 3.12	20.80	
0.03	0 7.05	6 40 34.06		+ 32 13 6.60	20.80	
0.11	0 39.53	33 16 59.76		+ 5 36 40.90	19.82	
0.01	+ 0 11.18	10 30 16.51		+ 28 23 24.15	22.79	
0.04	— 0 10.38	350 15 19.64		+ 48 38 21.02	45.01	
0.14	— 0 14.48	346 31 19.34	61.65	+ 52 22 21.56	52.70	
-0 0.03	+ 0 29.77	26 10 54.00		+ 12 42 46.90	52.32	
-0 0.04	— 0 26.54	336 19 4.04		+ 62 34 36.86	61.44	
-0 0.16	+ 0 19.11	17 31 58.29		+ 21 21 42.61	60.85	
-0 0.06	+ 1 19.64	52 50 40.51		— 13 56 59.61	—62.53	
-0 0.04	— 2 5.33	295 40 16.54	61.88	+ 76 46 35.41	+66.70	
-0 0.05	+ 0 26.33	23 27 58.91		+ 15 25 42.22	—62.89	
-0 3.60	—10 46.61	274 35 19.89		+ 55 41 38.76	+67.55	
5.36	1 19.49	307 23 17.52				
1.52	.50	.75				
0.05	.52	.55		+ 88 29 36.38	58.58	
0.90	.53	.35				
-0 4.51	1 19.54	.37				
-0 0.03	— 0 1.60	38 0 21.50	40.55	+ 0 52 58.30		P.
0.14	+17 3.43	45 39 5.40		— 6 45 45.60		
-0 0.10	0 25.52	22 41 43.09	41.78	+ 16 11 37.94	36.04	
-0 0.01	0 11.30	10 25 6.42	41.70	+ 28 28 14.53	17.17	
-0 0.19	0 9.87	9 7 20.21	41.60	+ 29 46 0.64	12.67	
6 4.33	0 9.98	9 13 24.46		+ 29 40 4.91	10.65	
0 0.02	+ 0 10.17	9 20 29.36	41.45	+ 29 32 51.34	2.82	
-0 0.02	— 1 26.45	305 28 51.60	41.40	+ 86 35 30.95	+17.86	
-0 0.09	0 6.26	354 13 25.08	41.30	+ 44 39 55.47	— 9.84	
+0 57.99	— 0 6.25	354 14 23.17		+ 44 39 5.90	—10.33	
+0 0.25	+ 2 29.56	67 39 40.38	41.15	— 28 46 19.98	+ 4.65	
-0 0.19	— 0 2.93	357 17 48.15	41.10	+ 41 35 32.20	—20.09	
-3 26.64	— 0 2.98	357 14 30.17		+ 41 38 58.70	20.52	
+0 0.10	+ 0 40.73	33 16 40.26	41.00	+ 5 36 39.99	19.52	
-0 0.14	2 0.39	62 45 30.90	40.80	— 23 52 10.85	—18.11	
-0 57.65	0 53.77	45 16 2.41	40.17	— 6 22 42.99		C.
+0 1.21	+ 0 54.84					
4.59	— 1 9.90	310 23 47.06				
1.39	.88	46.49				
0.00	.86	46.61		+ 88 29 33.24	+60.85	
0.97	.84	45.78				
4.88	— 1 9.81	44.97				
0.13	+ 0 10.84	10 39 13.55	63.14	+ 28 14 28.84	75.79	P.
+0 0.09	— 0 17.36	343 12 0.85		+ 55 41 41.54	70.06	
-0 3.38	— 1 7.40	310 24 7.27				
2.55	.39	8.11				
2.86	.39	7.80				
2.75	.39	7.91				
2.98	.39	7.68				
3.13	.39	7.53		+ 88 29 34.93	+61.10	
3.90	.39	6.67				
3.50	.38	7.17				
0 3.38	.38	7.29				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
March 3.		23h.,	30m.				
170° 59′	39.0	39″5	45″0	34″0	45″5	43″0	41″00
	39.0	39.5	45.0	34.0	45.5	43.0	41.00
	38.3	39.3	44.6	33.6	45.0	42.0	40.47
P.	37.5	39.3	44.6	33.0	45.5	41.5	40.23
	38.0	39.3	44.4	33.0	45.0	42.6	40.38
	38.5	40.2	45.0	34.0	46.0	43.0	41.12
Means	38.38	39.52	44.77	33.60	45.42	42.52	40.700 —.147
March 3.		4h.,	30m.				
179 59	40.2	40.3	44.3	36.0	46.6	45.5	42.15
	39.8	41.2	44.6	35.0	48.2	44.0	42.13
P.	39.5	40.8	43.7	34.6	47.0	44.0	41.60
	39.6	41.0	44.2	34.8	47.4	44.0	41.83
Means	39.78	40.82	44.20	35.10	47.30	44.38	41.930 —.150
March 3.		8h.,	30m.				
179 59	39.2	41.5	42.5	36.6	45.4	45.0	41.70
	37.8	40.5	42.0	35.2	45.2	43.7	40.73
P.	37.8	40.5	42.0	35.2	45.2	43.7	40.73
	37.8	40.5	42.0	35.2	45.2	43.7	40.73
Means	38.15	40.75	42.12	35.55	45.25	44.03	40.975 —.165
March 4.		23h.,	30m.				
179 59	37.4	39.4	43.0	33.5	45.8	41.6	40.12
	37.9	39.1	43.0	33.1	45.7	42.0	40.13
	37.9	39.2	42.9	33.0	45.0	41.8	39.97
C.	37.9	40.0	43.0	33.9	45.8	42.0	40.43
	38.0	40.5	43.9	33.9	46.1	42.1	40.75
	38.1	40.0	43.0	33.7	45.9	42.0	40.45
Means	37.87	39.70	43.13	33.52	45.72	41.92	40.308 —.139
March 5.		0h.,	20m.				
179 59	63.5	61.3	63.4	57.0	69.0	69.0	63.87
	62.4	60.6	62.6	55.7	67.8	68.3	62.90
	62.8	61.0	63.4	56.3	68.8	68.6	63.48
P.	62.4	60.5	62.6	55.8	68.4	68.2	62.98
	62.7	61.0	62.6	56.3	68.7	68.0	63.22
	62.7	61.0	62.6	56.3	68.7	68.0	63.22
Means	62.75	60.90	62.87	56.23	68.57	68.35	63.278 —.140

THERMOMETERS.

R POINTS.	Stone.	Upper.	Lower.
	°	°	°
3, No. 1	30.5	35.0	32.0
" 2	31.0	34.0	32.0
" 3		30.0	28.5
4, " 1	31.5	37.1	33.0
		38.0	33.0
5, " 1	35.0	48.0	40.0

		H. M. S.	
24.	App. R. A.	5 32 39	
25.	"	5 39 27.5	(10 mag.)
26.	"	6 5 35	
28.	"	6 31 53.5	
29.	"	6 33 35	
31.	"	7 11 17	
32.	"	7 12 46	

3. Very unsatisfactory observation.
14. Observed between micrometer and fixed wires.
14, 17. Very tremulous.
21 to 34. Interpolated Zenith Point doubtful.
25, 29, 32. Coincidence of March 4, employed.
35, 36. Observed diameter increased 2″ for inclination of wires.
Nadir Points, March 3, discordant: Temp. of stone below 32°.
Nadir Points, March 4, apparent error of collimation 30″ East.

DATES. 1846.	No. for ref.		OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMETE			
								A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.
				No.	m. s.	°	′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
March 5	1				— 8 12.3										30.040					
	2		Polaris, (Mic.)	5	— 9 59.3	310	25	17.5	15.7	18.4	10.0	24.6	24.0	18.33	.066		49.9	56.7		53.5
	3	α	Aurigæ	4	. . .	353	3	40.6	37.3	40.0	32.0	47.6	46.3	40.63	. .	29.954	51.0	51.3	38.0	50.5
	4	β	Tauri	4	. . .	10	25	16.5	12.8	14.3	11.3	21.0	21.5	16.23	. .	29.954	51.0	50.4		
	5	δ	Orionis	4	. . .	39	18	12.3	10.0	10.2	5.6	18.3	18.3	12.45	. .		50.7	50.0		
	6	α	Columbæ	4	. . .	73	0	30.0	29.0	28.8	26.0	35.4	37.8	31.23	. .	29.960	50.2	49.7		
	†7		Moon, S. L.	4	. . .	19	49	46.3	42.0	45.6	37.5	53.6	50.4	45.90	. .		50.0	49.5		49.5
	8	δ	Ursæ Minoris, S. P. . .	4	. . .	305	30	37.0	28.4	33.0	26.3	38.0	41.8	34.08	. .		49.8	49.5		
	9	α	Canis Majoris	4	. . .	55	23	8.3	5.3	7.6	3.0	14.6	14.8	8.93	. .		49.0	47.2		
	10	ε	Canis Majoris	4	. . .	67	37	42.0	40.0	42.5	37.1	48.8	50.5	43.49*d*	. .		49.0	46.3		
	11	α²	Geminorum	4	. . .	6	40	30.8	26.4	27.8	23.0	32.6	36.0	29.43	. .	29.954	48.2	44.7		47.5
	12	β	Geminorum	4	. . .	10	29	65.0	62.2	64.6	59.0	73.0	70.2	65.67	. .	29.954	48.0	45.0		
	13	15	Argus	4	. . .	62	43	60.0	57.0	58.5	54.3	66.8	65.2	60.30	. .	29.954	47.4	43.5		46.5
	14	λ	Ursæ Minoris, S. P. . .	4	. . .	307	45	47.0	44.5	48.0	40.0	55.0	54.8	48.22	. .		47.0	43.5		
	15	ι	Ursæ Majoris	4	. . .	350	15	28.0	23.5	28.0	20.4	31.3	34.3	27.58	. .		46.3	39.0		43.0
	16	α	Hydræ	4	. . .	46	52	33.7	29.8	31.2	27.3	37.7	39.4	33.18*d*	. .	29.946	45.0	37.5		
	17	α	Ursæ Majoris	4	. . .	336	19	29.0	26.0	27.3	21.5	31.3	35.0	28.35	. .	29.936	43.5	34.5		42.0
	†18	α	Cassiopeiæ, S. P. . . .	4	. . .	274	45	50.7	51.3	53.0	51.6	59.0	59.6	54.20	. .	29.904	39.0	31.5		39.0
	†19			5	— 9 56.4	307	25	7.2	6.7	7.0	4.4	12.3	15.0	8.77	30.403	29.896	38.5	31.5	40.0	39.0
	20				7 56.4										.418					
	21				5 56.4										.448					
	22				3 56.5										.464					
	23				1 36.4										.474					
	24		Polaris, S. P. (Mic.) . .	4	— 0 12.4										.483					
	25				+ 1 47.6										.460					
	26				3 47.6										.460					
	27				5 47.6										.435					
	28				7 47.6										.420					
	†29			3	+ 9 29.6			7.4	7.2	7.0	5.2	12.6	15.4	9.13	.413	29.886	38.0	31.7		38.5
6	30		Sun, S. L. (Mic.) . .	3	— 0 15.5	44	45	9.6	10.0	8.6	6.8	13.8	15.7	10.75	29.740	29.696	42.5	53.0	41.0	45.5
	31		Sun, N. L.	4†	+ 0 1.5	44	13	3.7	5.0	3.2	2.0	8.6	9.4	5.32	. .					46.4
7	32		Sun, N. L. (Mic.) . .	3½	— 0 12.0	43	50	5.4	4.8	3.1	3.8	7.9	13.0	6.33	30.222	30.056	43.7	44.1		46.0
	33		Sun, S. L.	4½	+ 0 6.0	44	22	5.1	5.1	4.0	3.0	9.1	11.5	6.31*d*	. .				43.8	46.0
	34		Bessel's Zone, 513, (Mic.)	4	. . .	9	9	45.2	43.3	45.9	42.0	47.1	50.0	45.58	32.071	29.950	43.5	38.7	44.2	43.7
	35		Bessel's Zone, 513, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	27.612					
	36		Bessel's Zone, 513, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	26.380					
	37	α	Orionis	4	. . .	31	30	53.5	50.1	52.7	49.8	57.0	59.9	53.83	. .	29.948	43.8	38.2		42.9
	38	κ	Aurigæ, 2001	4	. . .	9	20	42.8	40.1	42.7	39.5	44.0	48.8	42.98	. .	29.934	43.0	37.7		41.5
	39	μ	Geminorum	4	. . .	16	18	20.4	17.2	19.0	14.6	20.0	26.5	19.62	. .	29.934	42.8	37.7	44.1	42.0
	†40	δ	Geminorum	4	. . .	16	37	56.6	53.6	56.0	52.9	57.8	62.5	56.57*d*	. .	29.920	42.7	37.0		41.3
	†41		Moon, S. L. (Mic.) . .	3½	— 0 11.2	22	33	42.2	39.4	41.5	37.1	42.1	47.8	41.68	30.202	29.920	42.5	36.7		41.5
	42		Moon, N. L.	5	+ 0 14.9	22	3	27.8	24.9	27.6	22.1	27.6	34.1	27.35	. .					40.7
9	†43		Sun, S. L. (Mic.) . .	1	— 0 47.0	43	34	60.0	56.5	59.9	55.0	63.4	65.0	59.92	29.603	30.178	51.3	57.0	46.0	52.0
	†44		Sun, N. L.	4	. . .	43	3	6.8	3.0	5.7	2.3	8.0	11.5	6.22	. .					
	†45			3	— 9 26.6	310	25	12.0	7.6	11.3	4.6	14.5	18.0	11.33	29.905	30.162	51.3	54.3		
	46				7 26.6										.875					
	47				5 26.6										.868					
	48				3 26.6										.850					
	49				— 1 26.6										.838					
	50		Polaris, (Mic.)	4	+ 0 20.4										.846					
	51				2 20.4										.852					
	†52				4 20.4										.854					

DATE.			MICROMETER.		OBSERVED SEMI-DIAMETERS.		
			Coincid.	Val. 1 *r*.	Objects.	No.	Semi-diam.
			revs.	″			′ ″
Mar.	6,	0*h*.	29.936	62.73	Sun . .	30	16 9.31
"	7,	6*h*.	29.938		Sun . .	32	16 9.55
					Moon .	41	14 48.70
"	9,	0*h*.	29.929		Sun . .	43	16 7.01

March 6. After Sun, adjusted middle mic. wire more nearly parallel to fixed wire.
March 6. Error of Runs —0″.10. Temp. of circle 40°; of stone 40°
March 7. do. do. —0″.09 do. do. 44° do. 44°
March 9. do. do. +0″.03 do. do. 47° do. 47°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
nstrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 3.40	— 1 7.37	310 24 7.28				P.
3.37	1 7.37	7.31				
-0 0.18	— 0 7.07	353 3 33.74	62.92	+ 45 50 8.43	+13.71	
-0 0.03	+ 0 10 70	10 25 26.90		+ 28 28 15.27	17.20	
-0 0.22	0 47.61	39 19 0.28		— 0 25 18.11	25.53	
-0 0.05	+ 3 8.24	73 3 39.46		— 34 9 57.29	31.58	
-0 0.02	—32 52.35	19 16 53.57		+ 19 36 48.60		
-0 0.05	— 1 21.48	305 29 12.55		+ 86 35 30.38	18.06	
-0 0.22	+ 1 24.57	55 24 33.72		— 16 30 51.55	2.14	
-0 0.03	2 21.42	67 40 4.94		— 28 46 22.77	+ 4.88	
-0 0.04	0 6.88	6 40 36.27	62.70	+ 32 13 5.68	—21.52	
-0 0.01	0 10.90	10 30 16.56		+ 28 23 25.39	23.40	
-0 0.09	+ 1 53.84	62 45 54.23		— 23 52 12.28	—17.81	
-0 0.06	— 1 15.93	307 44 32.23		+ 88 50 50.28	+46.61	
-0 0.03	— 0 10.22	350 15 17.33		+ 48 38 24.62	—46.73	
-0 0.05	+ 1 3.58	46 53 36.81		— 7 59 54.86	41.89	
-0 0.02	— 0 26.29	336 19 2.08		+ 62 34 39.87	—64.02	
-0 0.02	10 40.50	274 35 13.65		+ 55 41 31.73	+70.17	
34.54	1 18.64	307 23 15.77				
33.65	.63	16.67				
34.09	.63	16.23				
34.06	.63	16.26				
34.09	.62	16.24				
34.46	.62	15.87		+ 88 29 34.45	61.22	
33.19	.61	17.15				
33.76	.60	16.59				
33.18	.60	17.17				
33.65	.59	16.71				
—0 34.73	— 1 18.58	15.64				
+0 12.24	+ 0 50.80	44 30 4.48	62.83	— 5 36 22.40		C.
+0 0.06	49.79					
—0 17.95	0 50.67	44 6 48.60	62.95	— 5 13 6.40		
+0 0.13	51.71					
—2 13.84	0 9.56	9 7 41.29		+ 29 46 0.91	12.68	
+2 25.91	0 9.64	9 12 21.12		+ 29 41 21.08	10.75	
3 43.33	0 9.66	9 13 38.56		+ 29 40 3.64	10.65	
0 0.10	0 35.67	31 31 29.60		+ 7 22 12.60	16.16	
+0 0.03	0 9.81	9 20 52.82		+ 29 32 49.38	2.74	
—0 0.04	0 17.43	16 18 37.01		+ 22 35 5.19	+ 2.19	
+0 0.07	+ 0 17.82	16 38 14.46		+ 22 15 27.74	—14.40	
—0 15.20	—20 6.23	21 58 31.35		+ 16 55 10.85		
—0 1.36	—19 43.34					
+0 19.50	+ 0 49.10	43 20 1.51	62.93	— 4 26 19.33		P.
0.13	+ 0 48.14					
+0 6.12	— 1 8.15	310 24 9.30				
6.25	.15	9.43				
5.35	.15	8.53				
5.58	.16	8.75				
5.82	.16	8.99				
5.22	.17	8.38		+ 88 29 33.35	+62.11	
5.12	.17	8.28				
5.67	.18	8.82				

NADIR POINTS—READINGS.							
	A.	B.	C.	D.	E.	F.	Means.
March 5.		9*h*.,	30*m*.				
179° 59′	62″3	59″4	61″0	57″6	66″6	69″0	62″65
	62.4	60.5	61.5	58.0	68.0	69.0	63.23
	61.4	60.0	61.0	57.4	67.4	68.0	62.53
P.	62.0	60.4	61.4	58.0	68.0	68.7	63.08
	61.4	60.2	61.0	58.0	68.0	68.2	62.80
	61.4	60.2	61.0	58.0	67.4	68.2	62.70
Means	61.82	60.12	61.15	57.83	67.57	68.52	62.833 —.138
March 6.		1*h*.					
179 59	65.0	57.4	61.0	57.1	63.0	71.0	62.42
	65.8	58.0	61.4	58.0	63.4	71.9	63.08
C.	65.5	59.0	61.1	58.6	64.5	71.8	63.42
	64.8	58.6	61.1	58.0	64.0	71.0	62.92
Means	65.27	58.25	61.15	57.93	63.72	71.43	62.958 —.133
March 7.		5*h*.					
179 59	63.0	60.5	62.0	60.2	64.1	70.2	53.33
	62.0	60.0	62.4	59.0	65.0	69.0	52.90
	62.2	60.2	62.1	59.6	64.9	69.0	53.00
C.	62.6	60.9	62.9	59.8	65.0	69.0	53.37
	61.9	60.2	62.1	59.1	65.0	69.0	52.88
	61.9	60.5	62.1	59.5	65.1	69.0	53.02
Means	62.27	60.38	62.27	59.53	64.85	69.20	53.083 —.131
March 9.		0*h*.					
179 59	63.2	59.6	61.7	59.3	65.0	69.6	63.07
	62.2	59.2	61.7	58.5	64.6	69.0	62.53
P.	63.0	60.3	62.6	59.2	65.6	69.6	63.37
	62.8	60.2	62.5	59.2	65.5	69.6	63.30
Means	62.80	59.80	62.12	59.05	65.17	69.45	63.067 —.135

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
h 5, No. 2	. .	44.0	41.0
6, " 1	41.0	54.4	57.0
7, " 1	44.2	45.0	43.2
		45.2	43.5
9, " 1	46.0	52.0	49.0

		H. M. S.	
34.	App. R. A.,	5 32 40	(8 mag.)
35.	"	5 39 6	
36.	"	5 39 28	
38.	"	6 5 36	(6 mag.)

7, 43, 44. Limbs poorly defined.
18. Very diffused.
19 to 29. Very unsteady; thin clouds.
40, 45 to 52. Through clouds.
41. Cor. to S. L. for defective illumination, +2″.71.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOM At.	Ext.	St.
			No.	m. s.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°
March 9	*1	Polaris, (Mic.)		+ 6 20.4								29.877				
	2			8 20.4								.883				
	3		5	+10 7.4								.927		52.0	54.0	
	4	α Orionis	4	. . .	31 30 54.0	50.0	52.5	50.3	55.5	61.3	53.93	. .	30.174	50.0	45.0	47.0
	5	κ Geminorum	4	. . .	16 18 21.0	17.0	19.6	14.4	22.0	25.8	19.97	. .		49.0	44.0	
	6	δ Ursæ Minoris, S. P.	4	. . .	305 30 38.0	32.2	37.2	33.6	37.4	43.2	36.93	. .		49.0	43.6	
	7	α Canis Majoris	4	. . .	55 23 6.3	2.6	6.5	4.6	9.4	12.7	7.02	. .	30.168	48.0	42.2	
	8	ε Canis Majoris	4	. . .	67 37 39.5	37.2	40.5	38.1	40.8	47.7	40.63*d*	. .		47.3	41.5	
	9	β Geminorum	4	. . .	16 37 57.5	54.0	57.0	53.3	60.0	61.8	57.27	. .		47.0	40.0	
	10	α² Geminorum	4	. . .	6 40 29.2	26.0	28.3	25.3	28.7	35.6	28.85	. .		46.5	39.7	
	11	α Canis Minoris	4	. . .	33 16 21.7	19.3	19.8	19.0	22.4	29.4	21.93	. .				
	12	15 Argus	4	. . .	62 43 56.6	55.0	56.0	55.2	60.6	62.7	57.68	. .		45.8	36.7	
	*13	ε Ursæ Minoris, S. P.	4	. . .	307 45 50.5	48.0	52.0	47.2	54.2	57.3	51.53	. .	30.168	45.5	36.5	
10	14	κ Aurigæ, 2001	4	. . .	9 20 42.0	39.0	41.0	39.6	43.0	47.6	42.03	. .	30.208	49.0	45.2	46.8
	15	δ Ursæ Minoris, S. P.	6†	— 8 8.0	305 30 43.1	39.7	43.0	40.9	46.0	48.9	43.60	. .			45.1	
	16		5	4 22.5	38.4	34.0	38.0	34.2	38.9	43.7	37.87	. .				
	17		4	— 0 1.5	36.2	31.2	32.0	32.9	36.5	41.9	35.12	. .	30.210	48.9		
	18		3	+ 4 15.0	34.0	38.0	37.4	35.0	39.0	44.1	37.92	. .				
	19		2†	+ 8 51.0	44.9	41.9	44.2	42.6	48.2	49.9	45.28	. .			44.6	
	†20	Bessel's Zone, 511	4	. . .	354 58 20.9	19.4	21.0	16.1	22.9	27.1	21.23	. .	30.214	48.4	44.2	
	†21	Bessel's Zone, 492, (Mic.)	4	. . .	357 14 14.0	12.5	14.0	12.9	17.0	21.4	15.30	26.251				
	22	Bessel's Zone, 492, (Mic.)	4	. . .	" " "	"	"	"	"	"	"	29.464				
	†23	Bessel's Zone, 492, (Mic.)	4	. . .	" " "	"	"	"	"	"	"	37.031	30.220	46.5	41.2	
	†24	Anonymous, (Mic.)	4	. . .	0 34 46.4	45.9	47.0	46.6	50.8	53.4	48.35	30.610	30.230	46.0	42.0	
	25	15 Argus	4	. . .	62 43 58.1	57.1	56.8	57.2	60.6	65.0	59.13	. .	30.234	45.2	41.4	
	26	Bessel's Zone, 401	4	. . .	7 29 37.3	36.2	38.0	36.1	38.6	42.4	38.10	. .	30.232	44.8	40.6	
	27	Bessel's Zone, 344, 345	4	. . .	14 20 10.7	9.1	10.8	8.4	12.9	17.2	11.52	. .	30.246	44.0	40.0	46.8
	28	α Hydræ	4	. . .	46 52 35.0	32.8	35.6	32.2	37.3	40.1	35.50*d*	. .	30.258	43.0	38.6	
	29	Moon, N. L., (Mic.)	3	— 0 14.7	31 31 1.0	0.1	1.9	0.1	6.1	7.1	2.72	28.025	30.270	43.2	37.7	
	†30	Moon, S. L.	5	+ 0 14.3	32 3 12.7	12.0	12.1	10.1	15.7	19.0	13.60	. .				
	31	α Ursæ Majoris	4	. . .	336 19 28.9	24.7	27.0	24.1	26.8	35.4	27.82	. .	30.280	42.2	36.0	46.8
	32	δ Leonis	4	. . .	17 31 38.5	37.5	39.2	39.3	39.8	45.0	39.88	. .				
	33	δ Hydræ et Crateris	4	. . .	52 49 22.9	22.0	22.6	23.0	22.9	30.0	23.90	. .	30.276	42.0	35.3	
	†34	γ Cephei, S. P.	4	. . .	295 42 17.0	15.3	15.1	16.1	19.0	25.0	17.92*d*	. .	30.272	41.5	35.6	
	35	β Leonis	4	. . .	23 27 33.5	32.4	32.5	32.8	32.9	40.1	34.03*d*	. .	30.284	41.0	35.5	
	36	Polaris S. P.	5†	— 6 37.7	307 24 35.0	36.9	36.5	33.9	37.1	41.2	36.77	. .	30.290	40.0	33.4	
	37			— 3 7.7	33.0	35.0	35.0	32.7	35.4	40.0	35.18	. .				
	38		4†	+ 1 52.3	32.9	34.0	33.8	31.8	33.1	39.9	34.25	. .				
	39			+ 6 2.3	34.8	36.0	35.3	33.8	35.1	41.4	36.02	. .	30.280	40.0	33.6	46.2
11	†40	Sun, S. L., (Mic.)	1	— 0 46.0	42 49 60.0	58.6	60.3	58.2	63.6	65.0	60.95	31.555	30.364	47.0	50.0	44.0
	†41	Sun, N. L.	4	. . .	42 16 3.0	1.3	2.5	0.6	7.0	9.0	3.90	. .				
	†42	Polaris, (Mic.)	3	— 9 26.3	310 24 64.0	60.3	64.0	57.8	67.4	68.0	63.58	29.774	30.326	49.0	51.3	
	43			7 26.3								.749				
	44			5 26.3								.731				
	45			3 26.3								.718				
	46			— 1 26.3								.706				
	47		4	+ 0 19.7								.693				
	48			2 19.7								.698				
	49			4 19.7								.710				
	50			6 19.7								.720				
	51			8 19.7								.755				
	†52		5	+10 5.7								.776	30.316	50.0	51.5	

DATE.	MICROMETER. Coincid.	Val. 1 r.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Mar. 10,	29.942	62.73	Moon .	29	14 51.98
" 11, 0*h*.	29.931		Sun .	40	16 7.70

Mar. 10. Error of Runs — 0″17. Temp. of circle 43° ; of stone 47°
Mar. 11. do. do. + 0.15. do. do. 50° ; do. 50°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.									Mic.	Barometer.	THERMOMET			
							A.	B.	C.	D.	E.	F.	Means.			At.	Ext.	St.	U
			No.	M. S.	°	′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	
March 11	1	α Orionis	4	. . .	30	30	53.7	49.4	52.2	50.0	55.3	59.5	53.35	. .	30.320	50.0	45.0	45.0	48
	2	μ Geminorum	4	. . .	16	18	20.8	16.0	18.7	14.0	20.7	25.0	19.20	. .		49.5	45.5		
	3	δ Ursæ Minoris, S. P.	4	. . .	305	30	37.7	30.7	36.0	32.4	37.0	41.4	35.87	. .	30.318	49.0	45.0		47
	4	Bessel's Zone, 511, (Mic.)	4	. . .	”	”	”	”	”	”	”	”	”	34.090		49.0	44.5		
	†5	Bessel's Zone, 511	2	. . .	354	58	21.6	18.7	21.6	16.8	22.5	27.6	21.47	. .					
	6	Bessel's Zone, 511, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	25.280					
	†7	15 Argus	4	. . .	62	43	58.5	54.2	57.0	55.3	60.4	63.7	58.18	. .	30.312	46.8	42.4		45
12	8	Sun, N. L.	3†	— 0 11.3	41	52	33.8	34.0	32.2	29.5	34.9	39.8	34.03*d*	. .				46.7	53
	9	Sun, S. L.	4‡	+ 0 19.5	42	24	45.1	45.0	44.1	41.1	48.4	51.4	45.85	. .	30.196	51.5	60.5		55
	10		3	— 9 29.4	310	25	12.4	9.3	12.1	5.0	15.8	18.0	12.10	. .	30.164	56.0	62.3	47.0	56
	11			— 4 30.4			16.2	14.4	16.4	9.0	19.2	22.1	16.22	. .					
	12	Polaris	4	+ 0 13.6			17.6	15.0	16.8	9.9	20.2	23.7	17.20	. .			62.2		56
	13			4 57.6			16.5	14.0	15.4	9.0	19.7	22.8	16.23	. .					
	14		5†	+ 9 57.6			13.0	9.1	11.6	5.0	15.4	18.2	12.05	. .	30.158	57.2	62.0		56
	†15	Jupiter, N. L.	4	. . .	25	4	56.0	51.1	53.4	49.1	56.0	61.1	54.45	. .	30.128	57.0	65.0	47.0	56
	16	Jupiter, S. L. (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	29.427					
14	†17	Aurigæ, 2200	6	. . .	355	10	20.4	17.3	20.0	15.1	21.9	27.1	20.30	. .	29.684	54.0	46.5	54.0	53
	†18	Anonymous, (Mic.)	6	. . .	"	"	"	"	"	"	"	"	"	30.712					
	19	Bessel's Zone, 492, (Mic.)	4	. . .	357	14	60.2	57.4	61.0	58.1	65.0	66.4	61.35	26.970	29.680	53.8	45.5		50
	20	Bessel's Zone, 492, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	30.201					
	21	Bessel's Zone, 492, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	21.336			45.8		
	†22	Anonymous, (Mic.)	4	. . .	0	34	60.4	57.0	60.1	57.9	64.9	66.4	61.12	30.832	29.690	52.8	45.0		50
	†23	Anonymous, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	25.880					
	24	Bessel's Zone, 350	4	. . .	8	21	2.0	3.1	3.5	3.1	9.4	8.0	4.85	. .	29.708	51.0	43.9		49
	†25	α Hydræ	4	. . .	46	52	35.9	34.0	35.3	33.8	38.0	41.1	36.35*d*	. .	29.726	49.0	42.0		48
	26	ε Leonis	4†	. . .	14	24	50.0	49.2	51.1	48.0	53.1	55.1	51.08	. .	29.730	49.0	42.4		48
	27	α Leonis	4	. . .	26	10	25.0	23.5	24.9	23.0	25.1	31.0	25.42	. .	29.730	48.5	43.9		48
	28	α Ursæ Majoris	4	. . .	336	19	25.7	22.1	26.0	21.1	26.0	32.6	25.58	. .	29.738	49.0	43.5	53.5	51
17	†29	Sun, S. L. (Mic.)	1	— 0 46.0	40	24	60.0	56.4	58.0	58.2	59.5	67.0	59.85	28.442	30.012	49.2	47.2	49.5	52
	30	Sun, N. L.	4	. . .	39	54	23.0	19.7	22.2	19.5	22.8	30.5	22.95	. .					
19	†31	Sun, N. L. (Mic.)	3†	— 0 14.7	39	7	14.2	12.1	13.0	11.2	16.6	20.7	14.63*d*	30.302					56
	†32	Sun, S. L.	5	+ 0 16.0	39	39	2.6	0.4	0.6	0.0	6.3	10.6	3.42	. .	29.930	53.0	66.0	49.0	57
21	†33		1	— 0 44.2	38	51	9.8	6.2	9.0	6.0	11.0	15.3	9.55	29.390					57
	34	Sun, S. L., (Mic.)	2†	28.2	"	"	"	"	"	"	"	"	"	.408					
	35		3	— 0 15.2	"	"	"	"	"	"	"	"	"	.430					
	36		5	+ 0 16.8	38	19	20.9	18.2	20.8	16.7	20.1	29.0	20.95	29.814	30.190	54.5	51.1	57.0	57
	37	Sun, N. L., (Mic.)	6	33.8	"	"	"	"	"	"	"	"	"	.840					
	†38		7	+ 0 49.8	"	"	"	"	"	"	"	"	"	.872					
	39	Bessel's Zone, 511	4	. . .	354	58	12.9	9.0	12.7	8.3	11.6	18.2	12.12	. .	30.208	51.5	46.0		50
	40	Bessel's Zone, 516	4	. . .	355	47	55.5	51.8	55.4	52.7	54.4	61.6	55.23*d*	. .	30.210	51.0	45.6		49
	†41	Anonymous, (Mic.)	6	. . .	357	4	61.9	58.3	62.8	60.3	64.3	67.9	62.58	30.671					
	†42	Anonymous, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	20.123					
	†43	Bessel's Zone, 452	4	. . .	358	14	15.6	14.0	16.1	14.1	17.9	21.1	16.47	. .	30.226	50.5	45.2	56.2	49
	†44	Bessel's Zone, 452, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	39.352					
	45	Anonymous, (Mic.)	4	. . .	0	39	60.8	57.2	61.0	59.1	62.4	66.6	61.18	29.134	30.218	50.0	45.1		49
	46	Anonymous, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	27.756					
	47	Anonymous, (Mic.)	4	. . .	"	"	"	"	"	"	"	"	"	30.807					
	48	15 Argus	4	. . .	62	43	52.9	50.8	52.0	50.9	53.4	57.9	52.98	. .	30.220	49.5	44.9		48
	49	Bessel's Zone, 401	4	. . .	7	29	29.2	25.0	27.9	27.2	26.1	34.6	28.33	. .	30.228	48.8	43.9		
	50	Bessel's Zone, 344, 345	4	. . .	14	20	3.2	1.3	4.1	1.0	5.1	7.9	3.77	. .	30.242	58.2	43.5		47
30	51	γ Cephei, S. P.	4‡	. . .	295	42	6.4	4.3	6.5	5.2	11.6	11.5	7.58*d*	. .	30.254	45.0	35.9	50.0	45
	52	γ Ursæ Majoris	4	. . .	344	20	59.0	54.9	59.0	56.5	61.4	65.3	59.35	. .	30.258	44.8	36.3		45

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Mar. 12, 0*h*.	29.931	62.73	Sun	8	16 6.61
			Jupiter	15	0 15.87
" 14, 0*h*.	29.938				
" 17, 0*h*.	29.934		Sun	29	16 5.33
" 19, 0*h*.	29.982		Sun	31	16 5.03
" 21, 0*h*.	29.984		Sun	33	16 7.86

Mar. 18. Adjusted horizontal wire and collimation.
Mar. 22 & 29. Four wires removed from mic. diaphragm ; readjustments carefully m
Mar. 12. Error of Runs + 0″.50. Temp. of circle 53°; of stone 47°
Mar. 14. do. — 0.10 do. do. 50° do. 54°
Mar. 17. } Mar. 19. } do. + 0.15 do. do. 50° do. 50°
Mar. 21. do. + 0.06 do. do. 50° do. 56°
Mar. 30. do. — 0.24 do. do. 46° do. 50°

Assumed Latitude 38° 53′ 39″.25 North.

RECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
ument.	Objects.		359° 59′		1850.0	
″	′ ″	° ′ ″	″	° ′ ″	″	
0.03	+0 35.03	30 31 28.35	62.87	+ 7 22 13.77	+16.23	P.
0.06	+0 17.37	16 18 36.63		+ 22 35 5.49	2.17	
0.02	—1 23.14	305 29 12.71		+ 86 35 30.59	+18.80	
20.87	0 5.31	354 53 55.29		+ 43 59 46.83	—11.82	
0.52	0 5.23	354 58 16.76		+ 43 55 25.26	11.97	
51.91	—0 5.15	355 3 8.23		+ 43 50 33.89	12.68	
0.02	+1 55.45	62 45 53.65		— 23 52 11.53	—17.00	
0.13	0 45.79	42 9 26.30	63.16	— 3 15 43.89		C.
0.35	+0 46.71					
4.63	—1 7.11	310 24 9.62		+ 88 29 32.37	+63.01	
1.02	.11	10.13				
0.02	.12	10.06				
1.24	.12	10.35				
5.12	—1 7.13	10.04				
0.01	+0 25.98	25 5 36.25		+ 13 48 6.22		
31.77	+0 25.96					
0.48	—0 4.90	355 10 15.88	62.99	+ 43 43 26.37	—11.28	
48.07	0 4.91	355 9 27.32		+ 43 44 14.93	11.30	
7.64	0 2.74	357 18 6.25		+ 41 35 35.99	20.99	
16.36	0 2.83	357 14 42.16		+ 41 39 0.08	21.42	
0.49	—0 2.63	357 23 59.21		+ 41 29 43.03	24.27	
56.08	+0 0.75	0 34 5.79		+ 38 19 36.45	28.52	
16.00	0 0.83	0 39 17.95		+ 38 14 24.29	29.13	
0.04	0 8.59	8 21 13.48	62.95	+ 30 32 28.72	37.51	
0.05	1 2.54	46 53 38.94		— 7 59 56.74	40.05	
0.01	0 15.06	14.25 6.13		+ 24 28 36.07	50.59	
0.01	+0 28.71	26 10 54.14	62.91	+ 12 42 48.02	52.51	
0.01	—0 25.64	336 18 59.93		+ 62 34 42.23	66.43	
32.93	+0 44.35	40 11 11.80	63.22	— 1 17 29.33		P.
0.04	0 43.48					
20.11	0 40.44	39 23 39.98	55.68	— 0 30 5.05		C.
0.34	0 41.25					
36.37	0 41.75	38 36 18.97	53.73	+ 0 17 14.01		
35.73						
34.50						
10.99	+0 40.52					
9.77						
8.16						
0.06	—0 5.21	354 58 6.97		+ 43 55 26.01	12.37	
0.04	0 4.36	355 47 50.91		+ 43 5 42.07	17.44	
42.83	0 3.09	357 4 16.66		+ 41 49 16.32	20.35	
20.81	0 2.91	357 15 20.48		+ 41 38 12.50	21.31	
0.00	0 1.82	358 14 14.65		+ 40 39 18.33	23.75	
40.89	—0 1.99	358 4 33.59		+ 40 48 59.39	25.00	
53.36	+0 0.69	0 40 55.23		+ 38 12 37.75	28.64	
19.71	0 0.73	0 42 21.62		+ 38 11 11.36	28.32	
51.68	0 0.67	0 39 10.17		+ 38 14 22.81	29.69	
0.00	1 54.50	62 45 47.48		— 23 52 14.50	15.93	
0.00	0 7.81	7 29 36.14		+ 31 23 56.84	37.84	
0.00	+0 15.19	14 20 18.96		+ 24 33 14.02	—41.79	
0.14	—2 4.93	295 40 2.79	57.18	+ 76 46 26.36	+77.84	
0.06	—0 16.91	344 20 42.50		+ 54 32 53.93	—69.82	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
March 12.		1h.,	30m.				
179° 59′	64″6	59″8	61″9	58″2	65″4	71″4	63″55
	64.0	60.4	62.9	58.8	66.0	70.7	63.80
	62.9	59.0	61.8	57.8	64.6	70:0	62.68
C.	63.6	60.2	62.1	58.1	64.9	70.1	63.17
	63.9	60.7	62.0	57.9	65.2	70.2	63.32
	63.2	60.6	62.0	58.0	65.6	70.1	63.25
Means	63.70	60.12	62.12	58.13	65.28	70.42	63.295 —.138
March 14.		6h.					
179 59	62.2	60.8	63.1	59.0	67.1	67.6	63.30
	62.0	60.8	62.6	58.9	67.1	68.4	63.30
	62.4	60.8	63.0	58.9	67.0	68.4	63.42
C.	62.8	60.0	62.1	59.0	65.2	68.6	62.95
	63.0	60.1	61.9	59.4	65.1	69.1	63.10
	62.2	59.6	61.9	59.0	65.0	68.1	62.63
Means	62.43	60.35	62.43	59.03	66.08	68.37	63.117 —.135
March 14.		10h.,	30m.				
179 59	60.5	62.0	63.9	60.0	67.0	66.2	63.27
	60.2	61.2	63.1	60.0	66.0	66.1	62.77
	60.1	61.1	63.1	60.9	65.9	66.6	62.95
C.	60.5	60.8	63.0	60.3	65.8	67.0	62.90
	60.8	62.0	63.1	60.2	66.3	66.7	63.18
	60.5	61.3	63.0	60.8	66.3	67.1	63.17
Means	60.43	61.40	63.20	60.37	66.22	66.62	63.039 —.133
March 17.		0h.					
179 59	62.2	60.5	63.2	59.5	65.0	67.7	63.02
	62.5	60.5	63.5	60.0	65.6	68.7	63.47
P.	62.5	60.5	63.5	60.0	65.6	68.7	63.47
	62.5	60.5	63.5	60.0	65.6	68.7	63.47
Means	62.42	60.50	63.42	59.87	65.45	68.45	63.355 —.134
March 19.		3h.					
179 59	56.8	50.9	57.0	48.4	57.8	61.6	55.42
	57.0	51.0	57.0	48.8	58.0	61.2	55.50
	56.2	51.4	56.9	48.8	59.1	60.9	55.55
C.	57.0	51.0	56.4	49.0	58.0	61.8	55.53
	57.0	52.0	57.2	49.9	60.4	62.0	56.42
	56.9	52.0	57.0	49.8	60.7	62.0	56.40
Means	56.82	51.38	56.92	49.12	59.00	61.58	55.803 —.125
March 21.		9h.					
179 59	54.0	50.4	52.4	53.4	50.6	61.2	53.67
C.	54.0	51.0	53.0	54.0	51.0	61.7	54.12
	53.2	51.1	53.2	53.6	50.5	61.4	53.83
Means	53.73	50.83	52.87	53.67	50.70	61.43	53.872 —.137

THERMOMETERS.

POINTS.	Stone.	Upper.	Lower.
	°	°	°
2, No. 1	47.0	56.5	52.4
		56.5	51.5
4, " 1	54.0	55.0	53.0
		55.7	53.0
" 2	53.5	49.7	49.0
		51.5	50.0
7, " 1	49.5	54.0	50.0
9, " 1	50.0	61.0	54.0
1, " 1	56.2	48.0	48.8

		H. M. S.	
4.	App. R. A.	6 37 46	(8 mag.)
5, 39.	"	6 38 18	(7 ")
6.	"	6 40 48	(10 ")
17.	"	6 35 39	(7 ")
18.	"	6 35 41	(9 ")
19.	"	7 11 18	(7 ")
20.	"	7 12 47	(9 ")
21.	"	7 23 6	(7 ")
22.	"	7 42 16	(9 ")
23, 47.	"	7 44 40	(8 ")
24.	"	8 26 35	(9 ")
40.	"	6 56 4	(8 ")
41.	"	7 7 23	
42.	"	7 10 50.5	
43.	"	7 20 30	
44.	App. R. A.	7 24 42	(7 mag.)
45.	"	7 40 50	(9 ")
46.	"	7 42 30	(8.9 ")
49.	"	8 24 32	(7 ")
50.	"	8 49 49	(7 ")

5, 17, 18, 29, 33 to 38, 41. Affected by unknown inclination of wires.
7. Becoming cloudy. 15, 22. Very faint..
25. Large; unsteady. 31, 32. Almost obscured.
33 to 38. Very unsteady; indicate large inclination of wires..
19, 23, 42. On 1st mic. wire S.; reduction of readings —0r.023..
21. On 2d mic. wire S.; do. do. —0.011.
44. On 2d mic. wire N.; do. do. —0.012.
43, 44. Dec. probably 1′ too small.
Nadir Point, March 21, considerable parallax to wires.

DATE. 1846.		No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMET			
						A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
				No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
March	30	1	β Corvi	4	. . .	61 24 38.1	37.9	39.9	36.9	39.9	43.6	39.38	. .	30.252	43.5	35.4		42.
		2		5	—10 45.3	307 24 27.0	26.4	28.4	23.4	28.0	31.9	27.52	. .	30.250	42.7	35.0	50.0	42.
		3			5 17.3	23.6	22.1	25.0	20.0	24.6	29.0	24.05	. .					
		4	Polaris, S. P.	4	— 0 52.3	21.6	19.6	22.0	18.1	21.9	27.2	21.73	. .			34.7		42.
		5			+ 4 7.7	22.9	21.1	23.0	20.1	23.2	28.9	23.20	. .					
		6		3	+ 8 47.7	24.6	24.3	26.1	22.9	26.1	30.9	25.82	. .	30.238	42.5	34.2		43.
	31	7	α Canis Minoris	4	. . .	33 16 16.0	13.6	14.9	12.4	18.5	23.0	16.40	. .	30.272	51.2	46.7		50.
		8	Anonymous, (Mic.) . .	4	. . .	0 34 63.2	59.6	62.9	60.0	66.4	67.9	63.33	31.032			46.0		50.
		9	15 Argus	4	. . .	62 43 57.0	53.9	55.0	54.1	58.0	61.7	56.62	. .	30.276	51.0	45.4	48.8	49.
		10	Bessel's Zone, 350 . .	4	. . .	8 20 56.0	54.8	56.0	54.8	60.4	60.2	57.03	. .	30.282	50.5	44.3		48.
		11	ε Hydræ	4	. . .	31 54 29.0	25.7	26.9	23.7	28.0	34.0	27.88	. .			44.4		47.
		12	ρ Ursæ Majoris, 3049 . .	5½	. . .	330 40 42.9	39.9	45.1	41.6	44.6	50.2	44.05	. .	30.288	49.8	44.2	48.3	48.
		13	ε Leonis	4	. . .	14 24 43.3	41.9	43.2	40.7	49.0	44.8	43.82	. .	30.286	49.0	43.6		48.
		14	α Leonis	4	. . .	26 10 18.9	18.0	19.4	16.2	20.9	24.2	19.60	. .	30.290	48.7	43.1		48.
		15	β Leonis	4	. . .	23 27 26.1	25.6	26.0	24.5	27.1	33.8	27.19*d*	. .	30.272	45.6	37.2		42.
		16	β Corvi	4	. . .	61 24 37.0	37.7	38.9	36.0	39.1	42.9	38.60	. .	30.282	44.2	36.1		42.
		17		7	—30 2.0	307 24 67.0	65.6	67.1	65.8	70.0	73.3	68.13	. .	30.280	43.8	36.1		42.
		18			25 14.0	53.8	52.2	55.0	52.2	56.2	60.2	54.93	. .					
		19		6	20 6.0	41.1	40.0	42.6	39.9	42.0	47.8	42.23	. .			36.1		41.
		20			15 17.0	32.7	31.6	33.1	30.7	32.6	39.5	33.37	. .					
		21		5	10 26.0	26.1	25.6	27.0	24.2	26.4	33.6	27.15	. .			35.7		41.
		22			5 27.0	21.9	21.1	22.0	19.6	22.3	28.9	22.63	. .					
		23	Polaris, S. P.	4	— 0 43.0	19.9	18.1	19.9	17.9	20.9	27.0	20.62	. .	30.282	43.0	35.3		41.
		24			+ 4 5.0	19.9	20.2	21.0	18.6	22.2	26.6	21.42	. .					
		25		3	8 56.0	23.0	24.1	24.1	22.0	25.6	29.2	24.67	. .			36.6		41.
		26			13 46.0	27.9	29.8	30.4	27.0	31.0	34.0	30.02	. .					
		27		2	18 51.0	37.4	39.1	40.1	37.4	41.8	43.1	39.82	. .			36.8		41.
		28			23 36.0	48.4	48.9	49.9	47.0	52.4	52.1	49.72	. .					
		29		1	+28 33.0	60.0	61.9	62.5	59.3	67.1	66.0	62.80	. .	30.284	41.8	36.8		41.
April	1	†30	Sun, S. L., (Mic.) . .	1	— 0 46.0	34 34 60.0	59.6	61.0	58.5	63.0	64.6	61.12	31.270	30.438	48.0	51.0		
		31	Sun, N. L.	4	. . .	34 1 36.0	36.0	38.5	36.0	37.5	42.0	37.67	. .					
		†32		3	— 8 46.9	310 24 59.0	57.0	61.0	54.7	63.0	63.4	59.68	29.700	30.436	48.6	53.3	46.0	
		33			6 46.9								.670					
		34			4 46.9								.651					
		35			2 46.9								.638					
		36			— 0 46.9								.638					
		†37	Polaris, (Mic.) . . .	4	+ 0 53.1								.655					
		38			2 53.1								.700					
		39			4 53.1								.708					
		40			6 53.1								.726					
		41			8 53.1								.746					
		†42		5	+10 39.1	60.0	57.5	61.6	55.3	64.8	63.4	60.43	.765		49.3	53.0		51.
		43	15 Argus	7	. . .	62 43 56.5	55.0	57.0	53.7	61.0	61.2	57.40	. .	30.380	50.0	46.5	47.0	49.
		44	ε Hydræ	4	. . .	31 54 27.4	25.3	27.3	23.0	28.0	34.2	27.53	. .	30.392	49.7	43.7		
		45	ι Ursæ Majoris	4	. . .	350 15 18.8	15.3	20.6	16.5	20.7	25.2	19.52	. .	30.386	49.5	43.7		
		46	α Hydræ	4	. . .	46 52 29.5	26.7	27.5	25.2	29.7	35.0	28.93*d*	. .	30.392	48.5	42.6		
		47	ε Leonis	4	. . .	14 24 42.4	41.3	43.3	39.0	44.8	47.5	43.05	. .	30.394	48.3	41.5		46.
		48	α Leonis	4	. . .	26 10 17.3	16.0	17.3	15.3	19.3	23.9	18.03	. .	30.390	47.5	40.9		45.
	2	†49	Venus, S. Cusp. . . .	4	. . .	44 19 55.2	55.6	56.0	54.2	58.0	60.0	56.50	. .	30.428	46.0	49.0	46.8	48.
		50	Venus, N. L., (Mic.) .	4	. . .	“ “ “	“	“	“	“	“	“	30.654					
	3	51		3	— 8 58.4	310 25 13.4	13.0	16.0	9.0	17.1	17.9	14.40	. .	30.482	50.0	54.9	46.7	51.
		52	Polaris		— 4 6.4	16.9	17.1	19.8	12.6	21.2	22.9	18.42	. .					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Mar. 31,	29.982	62.73			
April 1, 1*h*.	29.971		Sun .	30	16 1.16
“ 2, 0*h*.	29.987		Venus .	49	0 21.15

March 31. } Considerable loss of motion in micrometer.
April 2. }

March 31. Error of Runs +0″12 Temp. of circle 48°; of stone 48°
April 1. do. +0.25 do. 50° do 50°
April 3. do. —0.12 do. 45° do 48°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.03	+ 1 50.58	61 26 29.93	57.18	+ 22 32 53.50	—63.74	C.
6.04	— 1 19.01	307 23 2.47				
1.49	.03	3.53				
0.08	.05	2.60		+ 88 29 26.45	+68.83	
0.95	.08	3.17				
4.06	— 1 19.11	2.65				
0.04	+ 0 38.80	33 16 55.16	57.47	+ 5 36 41.56	—19.21	
-1 5.86	0 0.59	0 33 58.06		+ 38 19 38.66	29.71	
-0 0.05	1 54.60	62 45 51.27		— 23 52 14.55	15.23	
-0 0.03	0 8.73	8 21 5.73		+ 30 32 30.99	38.88	
-0 0.01	+ 0 37.01	31 55 4.90		+ 6 58 31.82	34.43	
0.47	— 0 33.39	330 40 11.13		+ 68 13 25.49	54.89	
-0 0.01	+ 0 15.31	14 24 59.14		+ 24 28 37.58	52.46	
-0 0.01	0 29.30	26 10 48.89		+ 12 42 47.83	53.18	
-0 0.05	0 26.17	23 27 53.41		+ 15 25 43.31	64.42	
-0 0.01	+ 1 50.53	61 26 29.12		— 22 32 52.40	—63.60	
46.57	— 1 18.88	307 23 2.68				
32.83	18.89	3.15				
20.88	18.90	2.45				
12.08	18.94	2.35				
5.64	18.98	2.53				
1.54	19.03	2.06				
0.04	19.05	1.53		+ 88 29 25.44	+69.13	
0.88	18.91	1.63				
4.14	18.85	1.68				
9.60	18.83	1.39				
18.37	18.81	2.64				
28.78	18.80	2.14				
42.09	— 1 18.80	1.91				
1 21.95	+ 0 35.81	34 18 13.82	57.38	+ 4 35 22.81		P.
-0 0.07	+ 0 35.07					
+0 21.05	— 1 8.90	310 24 12.21				
21.32	.90	12.48				
21.32	.91	12.47				
21.35	.91	12.50				
20.98	.91	12.13				
19.92	.92	11.06		+ 88 29 25.83	+63.27	
17.49	.92	8.63				
17.80	.92	8.94				
17.88	.93	9.01				
18.26	.93	9.39				
+0 18.85	— 1 8.94	9.97				
—0 0.41	+ 1 54.75	62 45 51.74	57.19	— 23 52 15.30	—15.17	
+0 0.03	+ 0 37.18	31 55 4.74		+ 6 58 31.70	34.45	
—0 0.02	— 0 10.26	350 15 9.24		+ 48 38 27.20	50.89	
+0 0.05	+ 1 3.86	46 53 32.84		— 7 59 56.40	40.01	
+0 0.02	0 15.43	14 24 58.50		+ 24 28 37.94	52.55	
0.00	0 29.53	26 10 47.56		+ 12 42 48.88	—53.23	
0.00	0 43.50	44 20 18.85	57.67	— 5 26 41.93		C.
—0 41.84	+ 0 43.03					
+0 4.14	— 1 8.80	310 24 9.74				
+0 0.85	.75	10.52				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
March 30.		11*h*.					
179° 59′	54″9	55″6	57″5	55″5	60″8	60″7	57″50
	55.1	55.1	57.3	55.0	60.0	61.0	57.25
	55.0	55.2	57.8	55.0	60.5	60.9	57.40
C.	55.5	55.3	57.3	55.2	59.8	61.1	57.37
	55.5	55.1	57.1	55.0	59.8	61.0	57.25
	55.0	55.0	57.2	54.9	59.8	60.7	57.10
Means	55.17	55.22	57.37	55.10	60.12	60.90	57.311 —.134
March 31.		9*h*.					
179 59	55.5	54.9	58.1	53.9	61.1	60.0	57.25
	55.8	54.9	57.9	54.9	60.0	61.9	57.57
	56.1	55.1	58.1	54.9	60.1	62.0	57.72
C.	56.0	54.8	58.6	54.1	60.0	61.1	57.43
	56.7	55.6	58.9	55.0	60.0	62.1	58.20
	56.0	54.9	58.0	54.0	60.0	61.7	57.43
Means	56.02	55.03	58.27	54.47	60.35	60.47	57.600 —.131
April 1.		1*h*.,	30*m*.				
179 59	57.6	53.4	58.4	53.5	58.0	62.8	57.28
	56.2	55.0	59.7	53.0	61.2	60.6	57.62
	56.5	54.5	59.7	53.0	61.2	61.3	57.70
P.	56.5	54.5	59.0	53.0	60.3	61.3	57.43
	56.5	54.5	59.0	53.0	60.8	61.3	56.52
	56.5	54.5	59.0	53.0	60.8	61.3	57.52
Means	56.63	54.40	59.13	53.08	60.38	61.43	57.511 —.130
April 1.		8*h*.					
179 59	56.0	54.0	57.4	54.8	59.4	61.4	57.17
	55.5	55.0	57.7	54.8	60.5	61.8	57.55
P.	55.5	55.0	57.7	54.0	60.5	61.0	57.28
	55.5	55.0	57.7	54.0	60.5	61.0	57.28
Means	55.62	54.75	57.63	54.40	60.22	61.30	57.321 —.130
April 3.		2*h*.					
179 59	56.2	56.8	59.8	53.1	62.8	61.5	58.37
	56.9	56.3	59.0	53.0	62.0	61.9	58.18
C.	55.2	55.8	58.6	52.2	61.9	60.6	57.38
	55.0	55.9	58.4	52.1	61.4	60.8	57.27
Means	55.83	56.20	58.95	52.60	62.02	61.20	57.800 —.130

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
30, No. 1	50.0	48.0	47.0
		48.0	47.0
31, " 1	48.3	48.5	48.5
		49.0	48.3
1, " 1	46.0	52.5	49.0
3, " 1	46.7	54.0	50.0

H. M. S.
8. App. R. A., 7 42 13 (9 mag.)
10. " 8 26 34.5 (8 ")
30, 32 to 42. Affected by inclination and loss of motion of micrometer wire.
37. Becoming unsteady and very faint ; thin clouds.
49. Correction of S. Cusp. for defective illumination, +0″.46.
Nadir Point, April 3, No. 1, mercury unsteady.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOME At.	Ext.	St.
			No.	M. s.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°
April 3	1	Polaris	4	+ 0 43.6	310 25 17.2	15.6	19.0	13.0	21.0	23.2	18.17	. .			55.2	
	2			5 33.6	17.1	16.1	18.3	12.2	19.7	23.4	17.80	. .				
	3		5	+10 31.6	12.9	10.1	14.0	8.4	15.9	18.1	13.23	. .	30.428	50.5	55.4	
	4	Mercury	4	. . . .	23 58 34.7	34.0	35.3	30.9	36.8	40.1	35.30	. .	30.314	51.6	55.8	
	5	λ Ursæ Minoris, S. P. . .	4†	− 8 17.0	307 45 39.6	37.9	41.0	35.0	43.8	45.0	40.38	. .	30.390	52.0	47.8	48.0
	6			3 57.0	37.9	35.1	38.9	33.2	40.2	43.6	38.15	. .				
	7			− 0 43.0	37.5	35.4	39.8	32.8	40.0	43.0	38.08	. .			46.9	
	8			− 3 19.0	37.9	36.0	39.2	33.2	40.8	44.0	38.52	. .				
	9			+ 7 1.0	39.1	37.5	42.1	34.2	40.1	44.1	39.52	. .	30.402	52.0	46.7	
	10	ε Hydræ	4	. . . .	31 54 27.8	25.2	27.1	22.7	29.0	33.1	27.48	. .	30.404	51.6	46.9	48.0
	11	ι Ursæ Majoris	4	. . . .	350 15 14.4	18.3	19.5	14.0	20.9	24.1	18.53	. .	30.408		46.7	
	12	α Hydræ	4	. . . .	46 52 32.8	29.0	32.2	26.1	34.4	37.0	31.92*d*	. .	30.416	51.0	44.5	
	13	ε Leonis	7	. . . .	14 24 42.7	40.6	43.0	36.9	45.0	46.4	42.43	. .	30.420	50.8	45.5	
	14	α Leonis	4	. . . .	26 10 18.4	17.0	18.5	13.7	21.0	23.0	18.60	. .	30.412	50.3	45.3	
	15	δ Leonis	4	. . . .	17 31 30.9	28.6	32.2	26.0	33.0	34.2	30.82	. .				
	16	δ Hydræ et Crateris . .	4	. . . .	52 49 19.9	18.8	22.1	18.2	20.7	26.4	21.02	. .	30.420	47.0	43.0	48.0
	17	γ Cephei, S. P.	4	. . . .	295 41 61.6	61.1	62.3	59.5	68.6	66.1	63.20*d*	. .	30.424	46.6	42.6	
	18	β Leonis	4	. . . .	23 27 25.6	24.4	25.1	22.1	26.8	31.9	25.98*d*	. .			42.3	
	19	β Corvi	4	. . . .	61 24 39.9	40.1	40.3	37.0	41.8	44.6	40.62	. .	30.442	45.0	41.0	
	20	Polaris, S. P.	5†	− 7 59.4	307 24 22.5	21.0	23.0	18.8	23.0	27.6	22.65	. .	30.452	44.8	40.1	48.0
	21			5 10.4	20.2	18.9	21.1	17.0	21.5	25.9	20.77	. .				
	22		4	− 0 42.0	18.7	17.0	19.1	15.3	20.0	25.0	19.18	. .			40.3	
	23			+ 3 33.6	19.0	18.0	20.0	16.1	20.6	25.3	19.83	. .				
	24			6 49.6	20.1	20.0	21.0	17.8	22.2	26.3	21.23	. .	30.450	44.8	40.3	
	25	α Virginis	4	. . . .	49 13 59.6	61.1	61.8	60.0	67.1	66.4	62.67	. .	30.456	44.6	40.0	48.0
	26	η Bootis	4	. . . .	19 43 9.1	8.8	10.9	7.0	13.8	11.1	10.12	. .	30.460	44.5	39.9	
	27	α Bootis	4	. . . .	18 54 19.9	15.0	15.1	14.0	17.9	15.4	16.22	. .	30.464	44.0	39.9	
	28	ε Bootis	4	. . . .	11 9 59.9	61.3	61.9	61.9	65.4	65.6	62.67	. .	30.476	44.0	38.6	
	29	β Ursæ Minoris	4	. . . .	324 7 24.5	25.6	28.1	22.8	28.8	29.5	26.55*d*	. .	30.474	43.5	38.2	48.0
	30	β Libræ	4	. . . .	47 41 12.2	12.9	11.9	12.1	16.1	18.9	14.02	. .	30.480	43.5	37.6	
	31	α Coronæ Borealis . . .	7	. . . .	11 39 23.2	24.4	24.0	23.8	25.4	30.0	25.13	. .	30.476	43.0	35.0	
	32	α Serpentis	4	. . . .	31 58 14.0	15.1	13.1	12.8	17.0	19.0	15.17	. .	30.474	42.3	34.0	
	33	ζ Ursæ Minoris	4	. . . .	320 38 41.5	44.3	46.0	41.6	47.3	46.0	44.45	. .	30.468	42.0	32.9	
	34	β^1 Scorpii	4	. . . .	58 14 37.1	40.1	39.1	40.2	41.5	45.4	40.57	. .	30.460	41.2	32.3	
	35	δ Ophiuchi	4	. . . .	42 10 16.9	20.0	17.7	18.6	21.1	24.1	19.73	. .	30.454	40.5	31.8	
	36	α Scorpii	4	. . . .	64 56 25.4	26.0	26.1	27.0	27.2	30.2	26.98	. .	30.456	39.5	32.2	47.5
	37	α Lyræ	4	. . . .	0 15 5.9	7.8	7.2	8.0	12.3	10.6	8.63	. .	30.476	37.2	32.3	47.0
4	38	Moon	4	. . . .	23 41 48.8	45.4	49.7	44.5	52.7	53.0	49.02	. .	30.534	51.8	47.5	47.0
	39	α Hydræ	4	. . . .	46 52 26.5	22.7	26.0	20.2	28.6	29.5	25.58	. .	30.544	51.0	45.4	
	40	β Cephei, S. P.	4	. . . .	288 49 24.7	20.0	23.6	19.6	24.2	27.7	23.30	. .				
	41	ε Leonis	4	. . . .	14 24 36.7	34.5	37.6	31.8	39.0	40.0	36.60	. .		50.0	44.2	
	42	α Leonis	4	. . . .	26 10 13.0	11.0	12.5	9.7	14.3	16.6	12.85	. .	30.548	50.0	43.5	
	43	α Ursæ Majoris	4	. . . .	336 19 10.0	4.0	10.0	4.7	11.3	14.6	9.10	. .	30.562	48.0	42.4	
	44	δ Leonis	4	. . . .	17 31 26.0	23.5	28.0	22.2	28.0	29.4	26.18	. .				
	45	δ Hydræ et Crateris . .	4	. . . .	52 49 16.2	15.3	18.0	13.7	18.6	20.8	17.10	. .		47.3	42.3	
	46	γ Cephei, S. P.	4	. . . .	295 41 56.3	52.0	57.0	54.6	61.2	61.7	57.13	. .	30.562	47.2	42.0	
	47	γ Ursæ Majoris	4	. . . .	344 20 51.3	48.0	53.0	48.2	56.2	56.6	52.22	. .	30.570	47.0	42.2	
	48	Polaris, S. P., (Mic.) .	5†	− 8 36.3	307 24 57.5	54.5	59.0	54.5	61.5	62.3	58.22	30.673	30.580	48.0	42.0	
	49			6 36.3								.692				
	50			4 36.3								.710				
	51			2 36.3								.720				
	52		4	0 51.3								.718				

DATE.	MICROMETER. Coincid.	Val. 1 *r*.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			
April 4, 13*h*.	30.004	62.74			

April 4. Before observations, loss of motion in micrometer screw corrected: wires adjusted: subsequently the telescope was found not sufficiently clamped.

April 4. Error of Runs +0″.25. Temp. of circle and stone 50°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
trument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0.01	− 1 8.70	310 24 9.48	57.67	+ 88 29 26.76	+69.84	C.
1.57	.66	10.71				
5.71	− 1 8.61	10.33				
0.11	+ 0 21.61	23 58 57.02		+ 14 54 39.90		
2.74	− 1 16.32	307 44 21.32				
0.65	.43	.07				
0.05	.50	.53	56.92	+ 88 50 45.12	+51.63	
0.47	.53	.52				
0 1.98	− 1 16.55	.00				
0 0.02	+ 0 36.97	31 55 4.47		+ 6 58 31.70	−34.49	
0 0.01	− 0 10.21	350 15 8.31		+ 48 38 27.86	51.13	
0 0.05	+ 1 3.66	46 53 35.63		− 7 59 59.46	39.94	
0.07	0 15.31	14 24 57.81		+ 24 28 38.36	52.73	
0.00	0 29.29	26 10 47.89		+ 12 42 48.28	53.33	
0.03	0 18.92	17 31 49.77	56.86	+ 21 21 46.34	63.91	
0.00	+ 1 18.83	52 50 39.85		− 13 57 3.74	−57.53	
0.02	− 2 3.97	295 39 59.25		+ 76 46 23.14	+78.85	
0 0.05	+ 0 26.03	23 27 52.06		+ 15 25 44.05	−64.75	
0 0.01	+ 1 50.03	61 26 30.64	56.80	− 22 32 54.59	−63.19	
3.28	− 1 18.73	307 23 0.64				
1.42	.71	.64				
0.05	.70	.43		+ 88 29 24.41	+69.99	
0.68	.69	.46				
2.39	− 1 18.69	.15				
0.03	+ 1 9.92	49 15 12.56		− 10 21 36.51	−61.82	
0.06	0 21.63	19 43 31.69		+ 19 10 4.36	58.99	
0 0.03	0 20.67	18 54 36.86		+ 19 58 59.19	61.75	
0.00	+ 0 11.96	11 10 14.63		+ 27 43 21.42	48.45	
-0 0.05	− 0 43.81	324 6 42.79		+ 74 46 53.26	46.39	
0.02	+ 1 6.57	47 42 20.61		− 8 48 44.56	46.91	
-0 0.09	0 12.59	11 39 37.81		+ 27 13 58.24	37.04	
-0 0.04	+ 0 38.13	31 58 53.26		+ 6 54 42.79	37.51	
-0 0.09	− 0 50.21	320 37 54.15		+ 78 15 41.90	29.98	
-0 0.06	+ 1 38.76	58 16 19.39		− 19 22 43.34	39.18	
0.03	0 55.53	42 11 15.29		− 3 17 39.24	33.03	
-0 0.16	2 10.47	64 58 37.61		− 26 5 1.55	−35.37	
-0 0.06	+ 0 0.28	0 15 8.85		+ 38 38 27.20	+21.95	
0.12	− 6 23.74	23 35 25.16	50.72	+ 15 18 4.81		P.
-0 0.09	+ 1 3.81	46 53 29.30		− 7 59 59.33	−39.91	
-0 0.04	− 2 53.93	288 46 29.41		+ 69 52 59.44	+68.41	
-0 0.03	+ 0 15.42	14 24 52.05		+ 24 28 37.92	−52.81	
-0 0.01	+ 0 29.52	26 10 42.36		+ 12 42 47.61	53.38	
-0 0.02	− 0 26.42	336 18 42.70		+ 62 34 47.27	71.89	
-0 0.02	+ 0 19.03	17 31 45.19		+ 21 21 44.78	64.03	
-0 0.03	+ 1 19.31	52 50 36.44		− 13 57 6.47	−57.45	
-0 0.06	− 2 4.67	295 39 52.40		+ 76 46 22.43	+79.10	
0.03	0 16.90	344 20 35.29		+ 54 32 54.68	−71.10	
45.80	− 1 18.74	307 22 53.68				
45.42	.74	54.06				
45.39	.74	54.09				
45.27	.74	54.21				
-0 44.83	.74	54.65		+ 88 29 24.21	+70.29	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
April 3.		*9h.*					
179° 59′	55″0	55″0	58″0	52″0	61″1	59″9	56″83
	55.5	55.0	58.1	51.9	61.6	59.9	57.00
	55.9	54.9	57.6	52.4	60.2	60.8	56.97
C.	56.1	55.0	57.7	52.9	60.1	60.9	57.12
	56.1	54.9	58.0	53.0	60.5	61.0	57.25
	55.9	55.0	57.8	52.8	60.1	61.1	52.12
Means	55.75	54.97	57.87	52.50	60.60	60.60	57.047
							—.131
April 3.		14*h*.					
179 59	53.0	57.1	57.4	54.6	61.1	57.9	56.85
	53.8	56.8	57.8	54.9	60.2	59.0	57.08
	53.4	56.8	57.6	54.8	60.1	58.9	56.93
C.	53.1	56.9	57.3	54.9	60.0	59.0	56.87
	53.1	57.0	57.2	55.1	60.1	58.9	56.90
	53.5	57.0	57.1	55.2	60.1	59.1	57.00
Means	53.32	56.93	57.40	54.92	60.27	58.80	56.939
							—.134
April 4.		12*h*.					
179 59	50.6	48.0	51.8	48.5	52.5	54.8	50.93
	48.0	50.8	52.8	47.0	55.5	52.4	51.08
	49.0	49.0	52.4	48.0	53.3	53.7	50.90
P.	48.0	49.6	52.4	47.3	54.4	52.7	50.73
	48.0	49.6	52.4	47.3	54.4	52.7	50.73
	48.0	49.6	52.4	47.3	54.4	52.7	50.73
Means	48.50	49.43	52.37	47.57	54.08	53.17	50.853
							—.128

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
3, No. 2	48.0	49.5	49.6
		51.0	49.8
3, " 3	48.0	43.0	44.7
		44.5	45.2
4, " 1	47.0	48.5	47.5

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMETI			
							A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up
			No.	M. S.	°	′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	
April 4	1	Polaris, S. P., (Mic.) . .		+ 1 9.7										30.718					
	2			3 9.7										.710					
	3			5 9.7										.710					
	4			7 9.7										.690					
	5		3	+ 8 51.7										.660		47.8			4
6	6		5†	− 8 58.6	307	24	23.1	22.0	24.0	19.0	27.0	28.5	23.93	. .	30.420	55.0	51.2	53.0	5
	7			− 3 44.6			20.0	18.0	20.6	13.1	22.0	25.1	19.80	. .					
	8	Polaris, S. P.	4	+ 0 13.4			18.7	17.0	19.6	13.0	21.0	24.5	18.97	. .			51.0		5
	9			4 14.4			19.1	18.0	20.1	14.0	21.9	25.3	19.73	. .					
	10		3	+ 9 46.4			23.0	22.4	23.6	17.6	26.0	28.6	23.53	. .	30.424	54.8	51.0		5
	11	η Ursæ Majoris	4	. . .	348	48	60.0	58.0	62.6	55.9	65.3	64.8	61.10	. .	30.418	54.0	50.2	53.0	5
	12	Anonymous	4	. . .	313	14	58.2	57.0	60.1	55.9	65.2	63.0	59.90	. .	30.384	51.8	46.3	53.0	5
	13	α Lyræ	4	. . .	0	15	10.4	11.6	11.8	10.0	16.0	16.1	12.65	. .	30.392	51.7	46.0		5
8	14	Venus, N. L.	4	. . .	14	19	29.0	29.0	30.0	27.3	28.7	32.6	29.43	. .	30.496	48.0	50.0	54.0	5
	†15	Venus, S. Cusp. (Mic.) .	4	. . .	"	"	"	"	"	"	"	"	"	29.383					
	16		3	− 9 48.0	310	24	61.0	60.2	64.0	56.5	65.4	65.0	62.02	29.693	30.478	52.0	60.0		
	17			7 48.0										.668					
	18			5 48.0										.658					
	19			3 48.0										.645					
	20			1 48.0										.633					
	†21	Polaris, (Mic.)	4	− 0 2.0										.628					
	22			+ 1 58.0										.637					
	23			3 58.0										.643					
	24			5 58.0										.662					
	25			7 58.0										.673					
	†26		5	+ 9 47.0			61.3	60.7	65.3	57.0	66.0	65.5	62.63	.715	30.472	52.7	62.0		
9	27	Moon, N. L.	4	. . .	42	36	13.6	13.0	15.5	11.5	17.5	17.0	14.68	. .	30.368	49.5	45.5		47.
	28	α Cassiopeiæ, S. P. . . .	6	. . .	274	45	39.0	40.0	44.4	42.0	44.2	44.0	42.27	. .	30.350	49.0	43.0		
	29		5	− 9 40.7	307	24	60.3	59.3	63.0	58.7	65.6	64.3	61.87	30.565	30.350	49.5	42.6		
	30			7 40.7										.593					
	31			5 40.7										.610					
	32			3 40.7										.624					
	33			− 1 40.7										.634					
	34	Polaris, S. P., (Mic.) .	4	+ 0 6.3										.644					
	35			2 6.3										.630					
	36			4 6.3										.625					
	37			6 6.3										.610					
	38			8 6.3										.590					
	39		3	+ 9 46.3			60.0	59.3	62.3	58.5	65.3	64.3	61.61	.566	30.342	49.0	42.3		
13	40		5	− 9 32.2	307	24	20.3	24.0	24.9	20.0	24.1	25.9	23.20	. .	30.056	45.9	37.5		44.
	41			− 4 5.2			17.6	20.1	21.1	16.9	20.9	23.1	19.95	. .					
	42	Polaris, S. P.	4	+ 0 6.8			17.1	19.0	20.0	16.0	20.0	22.6	19.12	. .	30.056		38.0		44.
	43			4 39.8			17.1	20.0	20.8	17.0	20.8	22.9	19.77	. .					
	44		3	+ 9 44.8			21.9	25.0	25.8	21.0	25.0	27.1	24.30	. .	30.056	45.8	38.3		45.
	45	α Virginis	4	. . .	49	14	0.1	4.3	3.6	4.0	7.6	6.7	4.38	. .	30.058	45.3	38.2	56.0	44.
	†46	β Ursæ Minoris	4	. . .	324	7	24.5	27.1	29.2	23.6	28.9	28.7	27.00*d*	. .	30.082	44.8	34.5		43.
	47	β Libræ	4	. . .	47	41	17.0	20.4	20.4	19.8	22.0	22.0	20.27	. .	30.080	44.5	34.0		45.
	48		1†	− 0 45.3	57	25	51.0	55.9	56.0	55.2	59.0	57.2	55.72	30.156	30.085	44.0	34.1	55.0	43.
	49	Moon, S. L. (Mic.) . .		0 23.2	"	"	"	"	"	"	"	"	"	.136					
	50			− 0 8.0	"	"	"	"	"	"	"	"	"	.108					
	†51	Moon, N. L. (Mic.) . .		+ 0 22.0	56	54	4.4	9.0	8.0	8.3	11.0	9.9	8.43	. .					43.
	†52		7†	+ 0 48.5	"	"	"	"	"	"	"	"	"	29.987					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
April 6, 14*h*.	30.003	62.74			
" 8, 23*h*.	29.998		Venus .	14	0 19.80
" 13, 13*h*.	30.007		Moon .	48	15 46.88

April 6. Before observations, tightened collar of telescope ; adjusted in level and azimuth ; adjusted horizontal wire by equatorial stars.

April 6. Error of Runs +0″.11. Temp. of circle 52° ; of stone 52°
April 8. } April 9. } do. do. +0″.33 do. do. 50° do. 50°
April 13. do. do. —0″.38 do. do. 45° do. 56°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
Instrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
−0 44.86	− 1 18.74	307 22 54.62				P.
44.81	.74	54.67				
45.66	.74	53.82				
45.69	.74	53.79				
45.22	1 18.74	54.26				
4.14	1 16.93	307 23 2.86				
−0 1.15	.95	1.70				
+0 0.01	.96	2.02	59.55	+ 88 29 23.82	+70.91	C.
−0 0.89	.96	1.88				
−0 4.90	1 16.97	1.66				
−0 0.03	0 11.67	348 48 49.46		+ 50 4 49.34	−60.36	
0.00	− 1 3.09	313 13 56.81		+ 85 39 41.99	+18.26	
−0 0.07	+ 0 0.26	0 15 12.84		+ 38 38 25.96	21.81	
−0 0.02	0 44.42	44 20 33.67	61.23	− 5 26 53.19		P.
38.79	+ 0 45.26					
24.11	− 1 8.12	310 24 18.31				
23.85	8.10	18.07				
23.07	8.07	17.32				
22.88	8.04	17.16				
23.07	8.02	17.37				
23.21	7.99	17.54		+ 88 29 22.99	71.76	
22.85	7.96	17.21				
23.08	7.94	17.46				
22.92	7.91	17.33				
23.67	7.88	18.11				
+0 22.08	1 7.85	16.55				
0.00	21 23.06	42 14 51.62	60.37	− 3 21 12.00		
−0 0.81	10 34.53	274 35 6.93		+ 55 41 27.31	78.90	
40.30	1 18.04	307 23 3.40				
40.26	.05	.43				
39.94	.05	.75				
39.85	.05	.84				
39.92	.06	.76				
40.41	.06	.27		+ 88 29 23.92	71.93	
39.76	.06	.92				
40.08	.07	.59				
40.20	.07	.47				
40.42	.07	.25				
40.45	1 18.07	.22				
4.67	1 18.10	307 23 0.35				
0.90	.06	0.99				
0.04	.03	1.05	59.77	+ 88 29 21.85	+73.28	C.
1.17	.00	0.60				
4.95	− 1 17.98	1.37				
−0 0.06	+ 1 9.28	49 15 13.60		− 10 21 34.58	−61.35	
+0 0.05	− 0 43.55	324 6 43.50		+ 74 46 55.52	49.36	
+0 0.11	+ 1 6.17	47 42 26.55		− 8 48 47.53	−46.78	
−0 5.60						
6.02	−46 53.80					
5.53		56 23 9.32		− 17 29 30.30		
3.14	−46 42.81					
−0 3.24						

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
April 6.		17*h.*					
179° 59′	55″8	60″0	60″6	55″1	65″1	60″6	59″53
	57.0	59.0	60.0	55.1	64.0	61.1	59.37
	56.9	59.1	60.0	55.8	64.0	61.1	59.48
C.	56.9	59.8	60.1	55.9	64.4	61.7	59.80
	56.9	59.6	60.2	56.0	65.0	61.9	59.93
	56.9	59.4	60.2	56.4	65.0	62.0	59.98
Means	56.73	59.48	60.18	55.72	64.58	61.40	59.683 —.133
April 8.		23*h.*					
179 59	59.8	60.0	64.0	58.2	62.8	63.7	61.42
	58.3	61.2	64.5	57.0	65.7	61.0	61.28
	59.3	60.0	64.0	58.0	63.5	63.0	61.30
P.	59.5	60.6	64.5	58.0	64.5	63.2	61.72
	59.2	60.6	64.0	57.7	64.3	62.5	61.38
	59.0	60.3	63.7	57.4	63.6	62.5	61.08
Means	59.18	60.45	64.12	57.72	64.07	62.65	61.364 —.134
April 9.		12*h.*					
179 59	57.5	59.2	62.0	58.4	64.2	62.2	60.58
	57.5	59.2	62.0	58.4	64.2	62.2	60.58
P.	57.5	59.2	61.4	58.4	64.0	62.0	60.42
	57.5	59.2	61.4	58.4	64.0	62.0	60.42
Means	57.50	59.20	61.70	58.40	64.10	62.10	60.500 —.133
April 13.		13*h.*,	30*m.*				
179 59	56.1	60.9	60.6	59.0	62.1	60.9	59.93
	55.9	61.0	60.8	59.1	62.5	60.7	60.00
	55.9	61.0	60.0	58.8	62.1	60.9	59.78
C.	55.8	60.9	60.1	59.0	62.6	60.6	59.83
	55.8	60.8	60.2	59.2	62.7	60.8	59.92
	55.9	60.9	60.2	59.0	62.8	60.9	59.95
Means	55.90	60.92	60.32	59.02	62.47	60.80	59.903 —.133

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
6, No. 1	53.0	52.0	51.8
		53.2	52.4
8, " 1	54.0	53.0	51.0
9, " 1		50.0	50.0
13, " 1	56.0	46.5	46.7
		49.5	49.2

H. M. S.
12. App. R. A. 18 20 12.
15. Correction of S. Cusp. for defective illumination, +0″.83.
21 to 26. Very unsteady ; faint.
46. Large and blurred.
51, 52. Correction of N. L. for defective illumination, —4″.72.
Nadir Point, April 8, by daylight illumination.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.									Barometer.	THERMOMETE			
						A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.
			No.	M. S.	° ′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
April 13	1	ζ Ursæ Minoris	5	+ 1 1.0	320 38	40.6	44.8	46.8	42.6	45.8	43.8	44.07	. .					44.2
	2	β¹ Scorpii	4	. . .	58 14	43.8	49.0	48.8	48.0	50.1	49.8	48.25	. .	30.086	44.5	33.7		43.0
	†3	β² Scorpii, (Mic.) . . .	4	. . .	“ “	“	“	“	“	“	“	“	30.215					
	†4	Polaris, (Mic.) . . .	3	− 9 40.0	310 24	59.3	59.6	64.6	56.7	65.4	63.0	61.43	29.660	30.168	50.6	52.5	51.5	
	5			7 40.0									.640					
	6			5 40.0									.610					
	7			3 40.0									.592					
	8			− 1 40.0									.578					
	9		4	+ 0 3.0									.580					
	10			2 3.0									.586					
	11			4 3.0									.603					
	12			6 3.0									.620					
	13			8 3.0									.640					
	14		5	+ 9 46.0									.658	30.150	51.5	55.0		53.5
14	15	α Cassiopeiæ	4	. . .	343 12	27.4	24.8	34.3	22.1	29.7	31.7	28.33*d*	. .	30.130	54.8	57.7	53.0	56.5
	16	Polaris, (Mic.) . . .	3	− 9 40.1	310 24	59.7	57.2	62.6	54.6	64.0	63.4	60.25	29.661	30.138	55.0	57.0		
	17			7 40.1									.644					
	18			5 40.1									.617					
	19			3 40.1									.605					
	20			− 1 40.1									.578					
	21		4	+ 0 1.9									.580					
	22			2 1.9									.590					
	23			4 1.9									.600					
	24			6 1.9									.600					
	25			8 1.9									.614					
	†26		5	+ 9 49.9									.670	30.138	56.0	58.0		57.5
15	27	Polaris, S. P. (Mic.) . .	5	− 9 47.0	307 24	59.7	58.8	61.7	58.3	64.7	64.8	61.33	30.588	30.292	50.0	39.3		
	28			7 47.0									.612					
	29			5 47.0									.624					
	30			3 47.0									.633					
	31			− 1 47.0									.643					
	32		4	+ 0 1.0									.646					
	33			2 1.0									.638					
	34			4 1.0									.637					
	35			6 1.0									.615					
	36			8 1.0									.597					
	37		3	+ 9 41.0									.582	30.296	49.0	38.4		
	†38	Polaris	3†	− 7 38.3	310 25	22.3	24.5	25.3	19.9	26.9	26.4	24.22	. .			55.5	51.8	54.
	39			3 52.3		25.0	27.2	29.0	22.6	29.0	29.0	26.97	. .					
	40		4	+ 1 5.7		26.2	28.9	30.6	23.9	30.9	30.0	28.42	. .	30.456	51.1	55.7		54.
	41			4 15.7		25.4	27.0	28.9	22.7	28.0	29.0	26.83	. .					
	†42			7 37.7		22.7	23.6	26.1	20.0	25.0	27.0	24.07	. .			56.1		54.
16	43	Sun, S. L., (Mic.) . .	1	− 0 47.0	28 59	31.6	33.1	34.2	32.1	33.9	35.1	33.33	30.056	30.446	52.0	57.0	51.8	54.
	44		2	0 30.0	“ “	“	“	“	“	“	“	“	.051					
	45		3	− 0 12.0	“ “	“	“	“	“	“	“	“	.072					
	46	Sun, N. L. (Mic.) . .	5	+ 0 18.0	28 27	43.6	45.0	46.0	44.0	47.0	46.8	45.40*d*	30.238					54.
	47		6	0 31.0	“ “	“	“	“	“	“	“	“	.260					
	48		7	+ 0 48.0	“ “	“	“	“	“	“	“	“	.246					
	49	Weisse, VIII, 1529 . .	4	. . .	51 34	18.6	18.1	19.1	16.9	21.2	23.1	19.50	. .	30.308	53.5	48.6		51.
	50	Polaris, S. P.	4	− 3 40.4	307 24	15.9	18.6	20.0	14.9	21.0	21.1	18.58	. .	30.296	50.0	44.5	52.2	48.
	51			+ 0 7.6		15.4	17.3	18.8	13.2	20.1	20.6	17.57	. .			44.6		48.
	52			+ 4 20.6		16.1	18.8	19.1	14.2	21.0	21.0	18.37	. .					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
April 13, 1*h*.	29.999	62.74			
“ 14, 1*h*.	30.006				
“ 15, 13*h*.	30.007				
“ 16, 2*h*.	30.005		Sun .	43	15 59.51

April 14. } Error of Runs + 0″.33. Temp. of circle and stone 50°
April 15. }
April 16. do. do. .33 do. do. do. 52°

Assumed Latitude 38° 53′ 39″.25 North.

TIONS FOR

Objects.	Corrected Readings.	Zenith Point. 359° 59′	Apparent Declinations.	Reduction to 1850.0	Observers.
′ ″	° ′ ″	″	° ′ ″	″	
— 0 49.45	320 37 54.91	59.77	+ 78 15 44.11	—32.61	C.
+ 1 37.25	58 16 25.48		— 19 22 46.46	38.69	
+ 1 37.24	58 16 12.53		— 19 22 33.51	—38.95	
— 1 8.35	310 24 19.19				P.
.31	18.70				
.27	19.29				
.23	19.49				
.19	19.86				
.15	19.66	61.28	+ 88 29 21.12	+73.43	
.12	19.56				
.08	19.16				
.05	19.18				
.02	19.47				
1 8.02	19.96				
0 17.41	343 12 10.97	60.73	+ 55 41 29.01	80.06	
1 7.73	310 24 18.91				
.72	18.22				
.70	18.56				
.69	18.37				
.68	19.54				
.66	19.32		+ 88 29 20.86	73.72	
.65	18.93				
.64	18.97				
.62	20.04				
.61	20.65				
1 7.59	18.84				
1 18.40	307 23 1.70				
.41	1.98				
.43	2.60				
.45	2.98				
.46	2.91				
.48	2.84	60.34	+ 88 29 22.93	73.86	
.49	3.10				
.51	2.51				
.52	2.82				
.54	2.46				
1 18.56	1.83				
1 8.66	310 24 18.59				C.
.65	19.03				
.63	19.82	60.62	+ 88 29 20.86	+74.00	
.61	19.13				
— 1 8.58	18.47				
+0 28.23					
	28 43 58.16		+ 10 9 41.71		
0 27.60					
+1 14.25	51 35 33.79		— 12 41 53.92	—33.81	
—1 17.62	307 22 60.26				
.61	59.97				
.62	59.80	60.48	+ 88 29 20.16	+74.13	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
April 13.		1h.,	20m.				
179° 59′	60″4	59″7	64″2	58″0	63″8	63″7	61″63
	59.0	61.2	64.3	57.6	65.5	61.8	61.57
	58.5	61.0	64.2	57.2	65.4	61.8	61.35
P.	58.6	61.0	63.7	57.2	65.4	61.8	61.28
	58.6	61.0	63.7	57.2	65.7	61.8	61.33
	58.6	61.0	63.7	57.2	65.7	61.8	61.33
Means	58.95	60.82	63.97	57.40	65.25	62.12	61.417 —.134
April 14.		1h.,	20m.				
179 59	60.0	57.8	62.4	56.0	63.4	64.0	60.60
	59.5	59.3	63.2	55.0	65.5	62.4	60.82
	59.5	58.3	62.5	55.7	63.5	63.3	60.47
P.	60.0	58.8	62.5	56.4	65.0	63.7	61.07
	60.0	58.8	62.8	56.4	65.0	63.7	61.12
	60.0	58.8	62.8	56.4	65.0	63.7	61.12
Means	59.83	58.63	62.70	55.98	64.57	63.47	60.864 —.134
April 15.		12h.,	30m.				
179 59	58.4	59.4	61.6	58.6	63.5	63.7	60.87
	57.0	60.0	61.6	57.0	65.0	61.3	60.32
	57.7	59.0	61.0	57.8	63.0	63.5	60.33
P.	57.0	69.0	61.6	57.8	64.3	62.2	60.48
	57.0	59.5	61.4	57.8	63.6	62.2	60:25
	57.0	60.0	61.6	57.8	64.8	62.2	60.57
Means	57.35	59.65	61.47	57.80	64.03	62.52	60.469 —.133
April 16.		8h.,	30m.				
179 59	60.3	59.0	60.1	57.0	63.4	64.6	60.73
	60.1	59.0	61.0	57.0	63.0	65.0	60.85
	58.7	59.9	61.4	55.2	64.4	62.4	60.33
	57.9	60.8	62.2	56.0	66.2	61.6	60.78
C.	59.0	60.7	61.9	56.6	65.0	63.1	61.05
	59.0	60.1	61.8	56.4	65.0	63.4	60.95
	58.9	60.0	61.3	56.3	64.9	62.1	60.58
	58.8	60.0	61.8	56.1	65.1	62.5	60.72
Means	59.09	59.94	61.44	56.32	64.63	63.09	60.750 —.134
April 16.		15h.,	30m.				
179 59	55.6	62.3	61.3	58.6	66.8	60.0	60.77
	56.1	61.8	61.1	59.0	66.1	60.8	60.82
	55.6	61.8	61.0	58.6	65.0	60.1	60.35
C.	55.6	61.1	60.9	58.2	65.3	60.3	60.23
	55.7	61.1	61.0	58.0	65.5	60.1	60.23
	56.0	61.1	61.0	58.9	65.4	60.0	60.40
Means	55.77	61.53	61.05	58.55	65.68	60.22	60.467 —.133

THERMOMETERS.

.	Stone.	Upper.	Lower.
	°	°	°
. 2	51.5	53.5	52.5
1	53.0	58.5	55.5
1		53.0	51.0
1	52.5	56.0	54.0
		56.6	54.0
2	52.0	48.2	48.8
		50.0	50.0

3. β^2 Scorpii follows β^1 0s.73, (3 wires.)
4 to 26. Very unsteady and faint.
38 to 42. Very unsteady.
49. App. R. A. 8*h*. 59*m*. 58*s*., (7.8 mag.)
Nadir Point, April 16, No. 1, mercury shaken by wind.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMETERS. At.	Ext.	St.	Up.	L
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°	
April 16	1	Polaris S. P.	3	+ 9 49.6	307 24 19.4	22.8	23.2	18.0	24.6	24.8	22.13	. .	30.304	49.8	44.5		48.6	50.
	2	α Virginis	4	. . .	49 14 1.9	5.1	5.5	2.6	10.6	7.0	5.45	. .	30.304	49.8	44.5		47.9	49.
17	†3	Sun, S. L.	4	. . .	28 38 19.6	16.3	21.0	14.8	21.6	23.7	19.50	. .	30.252	61.0	69.4	52.0	62.5	59.
	4	Polaris, S. P., (Mic.) .	5	− 9 48.6	307 24 67.7	61.3	66.3	59.0	70.4	71.2	65.98	30.731	30.222	63.0	60.5			
	5			7 48.6								.761						
	6			5 48.6								.782						
	7			3 48.6								.796						
	8			1 48.6								.802						
	9		4	− 0 2.6								.802						
	10			+ 1 57.4								.790						
	11			3 57.4								.790						
	12			5 57.4								.770						
	13			7 57.4								.750						
	14		3	+ 9 37.4								.782	30.224	63.0	60.5			
	15	Venus, N. L.	4	. . .	43 31 16.9	15.4	17.3	12.5	19.1	21.1	17.05	. .			70.6		66.0	60
	†16	Venus, S. Cusp. (Mic.) .	4	. . .	" " "	"	"	"	"	"	"	29.477						
	17	Polaris . . .	3†	− 9 48.8	310 25 19.0	18.1	22.0	11.0	24.9	23.0	19.67	. .	30.238	69.0	76.7		70.5	64
	18	(Mic.)		5 51.8								29.950						
	19	(Mic.)		5 21.8								.941						
	20	(Mic.)		5 1.8								.946						
	21			4 45.8	23.6	23.0	28.1	16.1	28.6	27.4	24.47	. .						
	22		4	− 0 2.8	24.0	23.0	27.0	16.9	28.6	28.4	24.65	. .						
	23	(Mic.)		+ 3 48.2								30.028						
	24	(Mic.)		4 18.2								.029						
	25	(Mic.)		4 38.2								.029						
	26			5 23.2	22.8	20.1	24.6	15.0	26.1	27.3	22.65	. .			76.9	59.0	70.5	64.
	27	(Mic.)		8 3.2								30.042						
	28	(Mic.)		8 23.2								.048						
	29	(Mic.)		8 54.2								.051						
	30		5	9 38.2	19.9	17.0	20.3	12.2	22.9	24.9	19.53	. .					71.4	66.
	31	(Mic.)		10 58.2								30.029						
	32	(Mic.)		11 18.2								.040						
	33	(Mic.)		+11 38.2								.042	30.230	70.0	77.6			
18	34	Sun, S. L. (Mic.) . .	3	− 0 29.6	28 17 24.5	21.9	23.0	18.1	27.5	31.6	24.49*d*	30.060					73.0	67.5
	35		5	+ 0 17.3	" " "	"	"	"	"	"	"	.071						
	36	Sun, N. L.	7	+ 0 49.2	27 45 25.8	23.0	25.9	18.1	27.1	32.0	25.32	. .	30.222	71.0	79.3	59.0	72.5	68.0
	37	Polaris, S. P. .	5	− 9 40.0	307 24 22.1	18.1	21.9	19.0	19.9	20.4	20.23	. .	30.060	68.2	66.3	62.5	67.9	65.6
	38	(Mic.)		4 57.0								30.061						
	39	(Mic.)		4 37.0								.072						
	40	(Mic.)		4 11.0								.075						
	41			− 3 33.0	18.0	13.0	16.9	14.0	15.0	15.8	15.45	. .						
	42		4	+ 0 2.0	15.6	13.0	17.0	13.5	15.0	15.9	15.33	. .			66.1		67.5	66.5
	43			3 59.0	18.0	12.9	16.9	14.0	15.0	16.0	15.47	. .						
	44	(Mic.)		7 8.0								29.956						
	45	(Mic.)		7 34.0								.962						
	46	(Mic.)		7 58.0								.951						
	47		3	+ 9 38.0	22.1	18.2	22.0	19.3	19.4	19.9	20.15	. .	30.056	68.1	65.9		67.3	66.5
	48	α Virginis	4	. . .	49 14 14.1	10.0	12.6	10.1	13.0	11.0	11.80	. .	30.054	68.2	65.7		67.1	65.5
19	†49	Polaris, (Mic.). . . .	3	− 9 35.8	310 24 60.7	59.3	63.6	59.0	58.6	54.6	59.30	29.601	30.496	61.5	67.3	62.0	64.0	61.5
	50			7 35.8								.570						
	†51			5 35.8								.553						
	52			3 35.8								.540						

DATE.	MICROMETER. Coincid.	Val. 1*r*.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
ril 17, 13*h*.	30.008	62.74	Venus .	15	0 17.04
18, 2*h*.	30.005		Sun .	34	15 57.67
18, 13*h*.	30.006				
19, 1*h*.	30.005				

April 18, 5*h*.	Adjusted the runs of microscopes.				
April 17.	Error of Runs + 0″33.	Temp. of circle 50° ;		of stone 50°	
April 18.	do. do. + 1.27	do.	do. 69°	do. 59°	
April 18, 12*h*. April 19.	do. do. — 0.65	do.	do. 65°	do. 65°	

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 4.97	— 1 17.64	307 22 59.52				C.
-0 0.03	+ 1 8.89	49 15 14.37	60.47	— 10 21 34.65	—61.25	
-0 0.26	—15 29.71	28 22 50.11	60.86	+ 10 30 50.00		P.
-0 50.26	1 15.06	307 23 0.66				
50.34	.06	0.58				
50.25	.06	0.67				
50.16	.06	0.76				
49.98	.07	0.93				
49.83	.07	1.08	60.90	+ 88 29 20.79	+74.39	
49.29	.07	1.62				
49.91	.07	1.00				
49.72	.07	1.19				
49.92	.07	0.99				
50.07	— 1 15.07	0.84				
—0 0.20	+ 0 42.01	43 32 15.90	60.89	— 4 38 35.76		C.
+0 33.08	+ 0 42.32					
4.90	— 1 5.36	310 24 19.21				
5.11	.35	19.43				
5.34	.35	19.66				
5.89	.35	20.21				
+0 1.09	.35	20.21				
—0 0.09	.33	19.23				
0.75	.30	18.60				
0.55	.30	18.74				
—0 0.43	.29	18.93		+ 88 29 20.94	74.51	
+0 1.41	.29	18.77				
1.00	.25	18.40				
0.92	.24	18.33				
1.18	.24	18.59				
4.74	.23	19.04				
4.71	.22	19.02				
4.30	.22	18.61				
4.65	— 1 5.22	18.96				
-0 3.74	+ 0 25.82	28 1 48.86		+ 10 51 51.28		
-0 3.73						
-0 0.64	+ 0 25.23					
-0 4.90	— 1 13.79	307 23 1.54				
4.72	.80	1.71				
5.24	.81	1.18				
5.23	.81	1.19				
0.72	.81	0.92				
0.07	.82	1.44	61.88	+ 88 29 20.21	+74.65	
-0 0.89	.83	0.75				
-0 0.38	.83	2.04				
-0 0.31	.84	1.32				
-0 0.06	.84	1.69				
-0 4.88	— 1 13.84	1.43				
-0 0.09	+ 1 5.56	49 15 17.27		— 10 21 36.14	—61.19	
-0 30.08	— 1 7.15	310 24 22.23				P.
30.28	.14	22.44				
30.00	.14	22.16				
29.90	.14	22.07				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
April 17.		2h.					
179° 59′	60″6	58″7	61″8	56″7	63″8	64″8	61″07
	59.3	60.0	62.4	56.0	65.4	62.8	60.98
P.	59.2	59.8	62.2	56.0	65.7	62.8	60.95
	59.2	59.8	62.2	56.0	65.7	62.8	60.95
Means	59.57	59.58	62.15	56.17	65.15	63.30	60.988 —.131
April 17.		13h.,	30m.				
179 59	61.8	58.0	61.2	55.7	65.0	66.5	61.37
	60.5	58.4	61.3	54.8	65.3	64.3	60.77
	60.6	59.0	61.3	54.8	66.2	64.5	61.07
P.	60.6	59.0	61.3	54.8	66.2	64.5	61.07
	60.4	58.7	61.3	54.8	66.2	64.5	60.98
	60.4	58.7	61.3	54.8	66.2	64.5	60.98
Means	60.72	58.63	61.28	54.95	65.85	64.80	61.039 —.135
April 18.		2h.					
179 59	63.0	56.7	62.0	53.0	64.9	67.4	61.17
	63.0	56.2	61.0	52.7	64.0	67.6	60.75
	62.7	56.9	61.4	53.1	64.9	67.0	61.00
C.	62.6	57.1	61.5	52.9	64.8	67.0	60.98
	62.0	58.0	61.9	52.8	65.5	66.2	61.07
	62.1	58.0	61.9	53.0	66.1	66.0	61.18
Means	62.57	57.15	61.62	52.92	65.03	66.87	61.025 —.138
April 18.		12h.					
179 59	63.6	61.0	64.1	60.1	64.1	59.9	62.13
	63.0	60.5	63.0	60.1	62.8	60.0	61.57
	63.8	61.5	64.0	60.6	63.8	60.6	62.38
C.	63.7	61.1	63.9	60.6	63.1	59.9	62.05
	63.9	61.3	63.9	60.9	63.1	60.6	62.28
	63.0	61.2	63.0	60.2	62.8	59.8	61.67
Means	63.50	61.10	63.65	60.42	63.28	60.13	62.014 —.130

THERMOMETERS.

R POINTS.	Stone.	Upper.	Lower.
	°	°	°
17, No. 1	52.0	62.0	57.5
" 2		62.5	59.5
18, " 1	59.0	72.0	66.5
		70.4	64.0
" 2	62.5	68.0	65.2
		68.6	64.8

3. Limb poorly defined ; unsteady.
16. Correction of S. Cusp. for defective illumination, +0″.80.
49 to 51. Very unsteady.
Nadir Point, April 17, No. 1, much parallax to microscopes.
Nadir Point, April 18, No. 1, determination difficult ; wind fresh.

DATE. 1846.	No. for ref.		OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMETERS.				
						A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.	Lo.
				No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°	°
April 19	1		Polaris, (Mic.) . . .	4	— 1 35.8								29.525						
	2				+ 0 13.2								.518						
	3				2 13.2								.518						
	†4				4 13.2								.532						
	5				6 13.2								.552						
	6				8 13.2								.580						
	7			5	+ 9 58.2								.604	30.490	62.0	67.4			
20	8	α	Hydræ	4	. . .	46 52 42.7	38.0	41.7	40.5	36.0	37.0	39.32	. .	30.340	62.0	60.0	63.0	65.0	64.
	9		Polaris, S. P., (Mic.) .	5	— 9 54.8	307 24 65.5	61.2	66.2	63.3	61.7	59.6	62.92	30.657	30.284	60.3	53.5			59.
	10			4	7 54.8								.690						
	11				5 54.8								.710						
	12				3 54.8								.730						
	13				1 54.8								.730						
	14				— 0 5.8								.737						
	15				+ 1 54.2								.735						
	16				3 54.2								.728						
	17				5 54.2								.706						
	18				7 54.2								.680						
	19			3	+ 9 33.2								.653						
	†20		Venus, N. L.	4	. . .	43 3 43.1	43.1	44.8	45.6	37.8	36.1	41.75	. .	30.230	59.5	66.7	61.5	64.0	61.
	†21		Venus, S. Cusp. (Mic.) .	4	. . .	“ “ “	“	“	“	“	“	“	29.490						
21	22		Sun, S. L. (Mic.) . .	1	— 0 45.0	27 15 8.2	7.0	9.1	6.8	6.1	2.0	6.53	29.614					69.6	66
	23			2	34.0	“ “ “	“	“	“	“	“	“	.621						
	24			3	22.0	“ “ “	“	“	“	“	“	“	.644						
	25			4	— 0 6.0	“ “ “	“	“	“	“	“	“	.640						
	26		Sun, N. L. .	5	+ 0 15.0	26 43 36.9	35.6	37.6	35.6	31.0	28.6	34.22	. .	30.180	68.8	76.5		70.1	6
	27		(Mic.) .	6	28.0	“ “ “	“	“	“	“	“	“	29.980						
	28		(Mic.) .	7	+ 0 40.0	“ “ “	“	“	“	“	“	“	30.000						
	†29	γ	Ursæ Majoris, (Mic.) .	4½	. . .	344 20 50.6	43.6	51.1	47.0	46.5	46.0	47.47	29.844	30.042	71.0	67.8		71.0	6
	30		Polaris, S. P., (Mic.) . .	5	— 9 48.0	307 24 47.4	41.2	48.0	44.9	41.3	43.9	44.45	30.421	30.030	69.2	65.5	64.2	68.5	6
	31			4	9 18.0								.422						
	32				8 48.0								.420						
	33				8 18.0								.423						
	34				7 45.0								.439						
	35				7 12.0								.436						
	36				2 22.0	47.2	41.0	48.0	44.3	41.0	43.6	44.18	.478						
	37				1 52.0								.481						
	38				1 22.0								.489						
	39				0 52.0								.487						
	40				— 0 11.0								.496			65.6			
	41				+ 0 38.0								.491						
	42				1 8.0								.489						
	43				1 38.0								.498						
	44				2 8.0								.496						
	45				6 18.0	47.1	41.0	48.0	44.8	41.1	43.0	44.17	.465						
	46				6 48.0								.461						
	47				7 18.0								.443						
	48				7 48.0								.448						
	49				8 18.0								.430						
	50				8 51.0								.439						
	51			3	+ 9 33.0								.419	30.026	68.5	65.7		67.2	66.
	†52	η	Ursæ Majoris, (Mic.) .	3½	. . .	348 49 6.0	0.5	7.0	2.0	3.8	0.1	3.23	30.072	30.026	67.8	65.1		67.7	66.

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 r.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
April 20,			Venus .	20	0 16.54
“ 21, 3*h*.	30.002	62.74	Sun . .	22	15 57.41

April 29. Error of Runs —0″.65. Temp. of circle 65°; of stone 65°
April 21. do. do. .48 do. do. 68°; do. 63°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
Instrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
+0 30.34	—1 7.13	310 24 22.51				
30.66	.13	22.83	63.08	+ 88 29 19.78	+75.07	P.
30.93	.13	23.10				
30.73	.12	22.91				
30.56	.12	22.74				
30.31	.12	22.49				
+0 30.45	—1 7.12	22.63				
—0 0.25	+1 1.63	46 53 40.70	62.52	— 7 59 58.93	—39.75	
45.86	—1 16.22	307 23 0.84				
46.12	.22	0.58				
45.98	.22	0.72				
46.24	.22	0.46				
45.67	.22	1.03				
45.94	.22	0.76	61.97	+ 88 29 19.58	+75.21	
46.02	.22	0.68				
46.19	.22	0.51				
45.84	.22	0.86				
45.65	.22	1.05				
45.45	—1 16.22	1.25				
—0 0.18	+0 42.18	43 4 40.29	62.02	— 4 10 59.02		C.
+0 32.12	0 42.54					
23.96	0 24.80					
23.60						
22.25						
22.73		26 59 57.06		+ 11 53 44.21		
0.32	+0 24.23					
2.11						
1.15						
+0 9.94	—0 15.79	344 20 41.62		+ 54 32 59.65	—75.25	
—0 30.98	1 13.84	307 22 59.63				
30.62	.84	59.99				
29.96	.84	60.65				
29.72	.84	60.89				
30.27	.83	60.35				
29.65	.83	60.97				
30.00	.83	60.35				
30.08	.83	60.27				
30.51	.82	59.85				
30.33	.82	60.03				
30.86	.82	59.50		+ 88 29 18.60	+75.52	
30.57	.82	59.79				
30.49	.82	59.87				
31.13	.82	59.23				
31.12	.81	59.25				
30.97	.81	59.39				
31.05	.81	59.31				
30.34	.81	60.02				
31.04	.81	59.32				
30.34	.81	60.02				
31.38	.81	58.98				
30.80	1 13.81	59.56				
—0 4.47	—0 11.19	348 48 47.56		+ 50 4 53.70	—64.43	

NADIR POINTS—READINGS.							
	A.	B.	C.	D.	E.	F.	Means.
April 20.		2h.					
179° 59′	65″6	63″2	66″0	63″6	60″6	60″3	63″22
	64.0	64.2	66.4	63.0	63.0	58.3	63.15
	65.5	63.3	66.0	64.0	61.0	60.6	63.40
P.	65.0	64.3	66.4	64.0	62.0	59.8	63.58
	64.7	63.8	66.0	64.0	61.3	59.5	63.22
	64.0	63.5	65.4	63.0	61.3	58.7	62.65
Means	64.80	63.72	66.03	63.60	61.53	59.53	63.203 —.127
April 20.		13h.,	30m.				
175 59	63.0	60.5	64.7	63.4	60.0	58.6	61.70
	62.0	62.7	66.4	63.0	63.0	56.0	62.18
P.	63.2	61.6	65.5	63.3	61.7	58.0	62.22
	63.0	62.3	65.5	63.7	62.2	57.0	62.28
Means	62.80	61.78	65.52	63.35	61.72	57.40	62.096 —.128
April 21.		12h.					
179 59	66.8	59.4	65.1	61.1	61.0	60.7	62.35
	65.6	59.8	65.0	60.1	61.1	60.6	62.03
	65.6	60.1	65.3	60.1	61.9	60.3	62.22
C.	65.0	59.9	65.0	60.2	61.0	60.2	61.88
	65.4	59.9	65.0	60.8	61.9	60.1	62.18
	65.0	60.7	65.0	60.9	61.8	60.0	62.23
Means	65.57	59.97	65.07	60.53	61.45	60.32	62.150 —.131

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
20, No. 1	62.0	68.0	64.0
20, " 2	63.0	61.0	
21, " 1	64.2	70.8	68.2
		70.0	67.2

4, 20, 21. Very unsteady.
21. Correction of S. Cusp. for defective illumination, +0″.77.
29, 52. Micrometer reading, the mean of six readings, at the several transit wires, reduced to the meridian.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.									Mic.	Barometer.	THERMOMETE			
							A.	B.	C.	D.	E.	F.	Means.			At.	Ext.	St.	Up.
			No.	M. S.	°	'	"	"	"	"	"	"	"	Revs.	In.	°	°	°	°
pril 21	1	Venus, N. L.	4	. . .	42	53	22.6	19.6	23.0	22.0	16.8	17.3	20.22	. .	30.098	66.4	74.6	65.0	71.
	†2	Venus, S. Cusp. (Mic.)	4	. . .	“	“	“	“	“	“	“	“	“	29.477					
22	†3	Sun, S. L., (Mic.)	1	− 0 47.0	26	54	60.0	54.5	59.6	55.0	54.3	53.5	56.15	29.658	30.100	73.8	81.6		
	4	Sun, N. L.	4	. . .	26	23	28.8	22.3	27.3	23.2	21.6	21.7	24.15	. .					
	5	α Leonis	4	. . .	26	10	27.5	23.0	27.0	25.4	20.0	20.7	23.93	. .	30.064	67.5	60.3	66.5	65
	6	α Ursæ Majoris	4	. . .	336	19	19.7	14.0	21.2	14.4	16.7	12.7	16.45	. .	30.064	65.0	58.5		63
	7	δ Leonis	4	. . .	17	31	38.7	32.4	39.0	38.0	30.0	31.0	34.85	. .					
	8	δ Hydræ et Crateris	4	. . .	52	49	33.8	29.0	33.3	34.5	25.7	28.6	30.82	. .	30.064	64.0	58.0		6
	9	β Leonis	4	. . .	23	27	33.3	28.2	33.0	34.6	26.0	27.0	30.35	. .					
	10	γ Ursæ Majoris	4	. . .	344	20	59.4	55.0	61.2	56.5	56.5	53.3	56.98	. .	30.052	62.5	57.0		61
	11	β Corvi	4	. . .	61	24	51.7	52.0	55.2	53.7	49.7	48.5	51.80	. .	30.064	61.3	55.7		6
	12		5	−10 2.3	307	24	61.7	59.3	63.6	61.6	58.0	56.4	60.10	30.643	30.050	60.8	55.0		5
	13			8 2.3										.665					–
	14			6 2.3										.683					
	15			4 2.3										.702					
	16			2 2.3										.706					
	17	Polaris, S. P., (Mic.)	4	− 0 12.3										.722					
	†18			+ 1 47.7										.722					
	19			3 47.7										.698					
	20			5 47.7										.687					
	21			7 47.7										.660					
	22		3	+ 9 25.7										.643		60.0	54.5		
23	23	Sun, N. L. (Mic.)	5½	0 20.0	26	3	14.2	14.8	13.0	14.8	10.0	5.9	12.12	29.868					65.
	24	Sun, S. L.	7	+ 0 47.0	26	35	12.0	12.5	10.6	15.0	8.0	6.2	10.72	. .	30.038	62.5	68.4		65.
	†25	α Ursæ Majoris	4	. . .	336	19	18.7	12.1	18.1	10.6	13.1	13.0	14.27	. .	29.950	68.0	65.1	65.5	68.
	26	δ Leonis	4	. . .	17	31	38.6	33.9	39.0	37.6	30.2	31.1	35.07	. .			64.7		67.
	27	β Leonis	4	. . .	23	27	35.1	31.1	33.5	34.2	27.0	29.0	31.66*d*	. .	29.925	67.1	63.4		65.
	28	Canum Ven., 4345, (Mic.)	4	. . .	”	”	”	”	”	”	”	”	”	29.785					
	29	12 Canum Venat.	4	. . .	359	44	46.9	44.1	48.1	48.2	42.2	41.4	45.15	. .	29.900	65.2	61.4		63.
	30			− 7 28.3	307	24	19.5	16.0	20.1	19.5	14.9	14.6	17.43	. .	29.900	65.1	61.2	65.8	63.
	31			2 16.3			16.1	12.3	16.9	15.0	11.9	11.0	13.87	. .					
	32	Polaris, S. P.	4	− 0 7.3			15.0	11.9	16.1	15.0	10.8	10.8	13.27	. .			61.1		63.
	33			+ 3 53.7			14.9	12.8	16.2	14.0	12.0	9.1	13.17	. .					
	34			+ 7 38.7			18.7	17.0	20.6	18.5	16.0	13.6	17.40	. .	29.900	65.0	61.2		63.
	35	η Ursæ Majoris	4	. . .	348	48	59.9	58.6	63.0	59.1	58.9	53.6	58.85	. .	29.896	64.5	60.8		64.
	36	η Bootis, (Mic.)	5	. . .	19	42	52.1	48.7	52.5	51.7	46.7	44.5	49.37*d*	29.645			60.6		64.
	†37	α Bootis	4	. . .	18	54	25.0	21.1	24.9	22.9	19.1	16.6	21.60	. .	29.892	64.0	60.0	65.8	62.
24	38	Venus, N. L.	4	. . .	42	19	8.8	4.9	7.0	6.0	4.8	1.9	5.57	. .	29.830	73.0	79.0	69.5	75.
	†39	Venus, S. Cusp. (Mic.)	4	. . .	“	“	“	“	“	“	“	“	“	29.525					
25	†40		4	. . .	25	34	41.4	38.0	41.1	38.7	33.8	34.9	37.98	14.030	29.848	75.1	74.2	69.0	74.
	†41	Sun, W. Cusp. (Mic.)	5	. . .	“	“	“	“	“	“	“	“	“	13.952					
	†42		6	. . .	“	“	“	“	“	“	“	“	“	13.862					
	†43		7	. . .	“	“	“	“	“	“	“	“	“	13.818					
	†44	Moon, N. L., (Mic.)	7	+ 0 46.7	“	“	“	“	“	“	“	“	“	29.458					
	†45	Sun, E. Cusp. (Mic.)	6	. . .	“	“	“	“	“	“	“	“	“	26.096					
	†46		7	. . .	“	“	“	“	“	“	“	“	“	26.195					
26	47	Venus, N. L.	4	. . .	41	53	40.0	40.8	42.2	44.9	34.8	33.7	39.40	. .	29.948	55.0	57.8	63.0	57.9
	†48	Venus, S. Cusp. (Mic.)	4	. . .	“	“	“	“	“	“	“	“	“	29.546					
	†49		3	− 9 27.1	310	24	58.2	57.2	63.4	58.5	56.0	50.6	57.32	29.548	29.964	57.4	61.6	62.0	61.0
	50			7 27.1										.522					
	†51			5 27.1										.503					
	52	Polaris, (Mic.)		3 27.1										.486					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	"			' "
ril 21,		62.74	Venus .	1	0 16.82
22, 2*h*.	29.997		Sun .	3	15 56.70
23, 11*h*.	30.004		Sun .	23	15 55.98
24, 0*h*.	30.000		Venus .	38	0 15.43
25, 3*h*.	30.001	62.752			
26, 1*h*.	30.006		Venus .	47	0 14.97

April 22. Error of Runs —0″60. Temp. of circle 65°; of stone 65°
April 23. do. .64 do. 65° do. 65°
April 25. do. .22 do. 74° do. 69°
April 26. do. .60 do. 65° do. 65°

ECLIPSE OF SUN, APRIL 25. OBSERVED TIMES OF TRANSIT.

	WIRE I.	II.	III.	IV.	V.	VI.	
	H. M. S.	S.	S.	S.	S.	S.	
Sun's W. Limb . . .	2 9 7.0	23.5	39.0	55.0	10.7	(26.6)*	(4
Sun's W. Cusp. . . .	2 9 ..	. .	59.8	16.0	32.0	48.0	
Sun's E. Cusp. . . .	2 12 ..	. .	. .	. .	. .	37.5	5.

Correction of clock +10*s*.6. *Completed by means of the intervals.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
Instrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
- 0 0.08	+ 0 40.99	42 54 17.95	63.03	— 4 0 35.67		P.
- 0 32.70	0 41.85					
20.83	0 24.09	26 39 44.37		+ 12 13 57.51		
0.00	0 23.52					
0 0.04	+ 0 28.11	26 10 52.08	62.22	+ 12 42 49.39	—54.43	
0 0.13	— 0 25.18	336 18 51.14		+ 62 34 50.33	75.86	
0 0.29	+ 0 18.14	17 31 53.28		+ 21 21 48.19	66.02	
0 0.08	1 15.64	52 50 46.38		— 13 57 4.91	56.45	
0 0.46	+ 0 24.95	23 27 55.76		+ 15 15 45.71	66.44	
0 0.18	— 0 16.13	344 20 41.03		+ 54 33 0.44	75.47	
0 0.02	+ 1 45.55	61 26 37.33		— 22 32 55.86	—61.05	
45.60	— 1 15.43	307 22 59.07		+ 88 29 18.05	+75.85	
45.14	.43	59.53				
44.85	.44	59.81				
45.02	.45	59.63				
44.67	.46	59.97				
45.49	.47	59.14				
45.68	.47	58.95				
44.76	.48	59.86				
45.08	.49	59.53				
44.80	.49	59.81				
45.18	— 1 15.50	59.42				
+ 0 7.95	+ 0 23.81	26 19 39.86	61.80	+ 12 34 1.19		C.
+ 0 0.74	+ 0 24.38					
− 0 0.07	— 0 24.76	336 18 49.44		+ 62 34 51.61	—76.06	
− 0 0.14	+ 0 17.85	17 31 52.78		+ 21 21 48.27	66.13	
+ 0 0.06	+ 0 24.57	23 27 56.29		+ 15 25 44.76	66.54	
+ 0 13.66	— 0 0.25	359 44 58.56		+ 39 8 42.49	69.58	
− 0 0.04	0 0.25	359 44 44.86		+ 39 8 56.19	—69.58	
3.00	1 14.16	307 22 60.27		+ 88 29 19.32	+76.17	
0.38	.16	59.33				
0.11	.17	58.99				
0.87	.16	58.44				
3.13	1 14.15	60.12				
− 0 0.11	— 0 11.24	348 48 47.50		+ 50 4 53.55	—64.98	
+ 0 22.65	+ 0 20.38	19 43 32.40		+ 19 10 8.65	61.74	
− 0 0.10	0 19.50	18 54 41.00		+ 19 59 0.05	—64.54	
− 0 0.04	0 39.64	42 20 0.60	62.40	— 3 26 18.95		
+ 0 29.89	0 40.58					
−16 43.65	0 26.10	25 18 20.43		+ 13 35 21.22		
16 48.59	26.09	25 18 15.48		+ 13 35 26.17		
16 54.15	26.08	25 18 9.91		+ 13 35 31.74		
−16 56.83	+ 0 26.07	25 18 7.22		+ 13 35 34.43		
+ 0 41.44	— 8 35.28	25 26 44.14		+ 13 26 57.51		
− 4 5.12	+ 0 26.35	25 30 59.21		+ 13 22 42.44		
3 58.91	0 26.36	25 31 5.43		+ 13 22 36.22		
− 0 0.23	0 41.56	41 54 35.69	62.44	— 3 0 54.00		
+ 0 28.74	+ 0 42.52					
33.38	— 1 6.74	310 24 24.10				P.
33.28	.73	24.01				
33.16	.72	23.90				
33.35	.71	24.10				

NADIR POINTS—READINGS.							
	A.	B.	C.	D.	E.	F.	Means.
April 22.		2h.,	20m.				
179° 58′	67″8	59″5	66″0	61″2	59″3	62″8	62″77
	66.8	61.3	67.3	61.2	62.3	61.3	63.37
P.	67.0	61.5	67.3	61.2	62.0	60.5	63.25
	67.0	61.5	67.3	61.2	62.0	60.5	63.25
Means	67.15	60.95	66.97	61.20	61.40	61.28	63.158 —.133
April 22.		10h.,	20m.				
179 59	65.4	60.0	65.3	62.5	61.2	59.7	62.35
	64.2	61.0	65.7	61.7	60.7	58.2	61.92
	64.2	61.0	65.7	61.7	61.0	58.2	61.97
P.	65.2	61.0	66.3	63.4	61.6	58.8	62.72
	65.2	61.0	65.5	62.5	60.7	59.7	62.43
	65.2	61.5	66.0	52.8	61.2	59.7	62.73
Means	64.90	60.92	65.75	62.43	61.07	59.05	62.353 —.130
April 23.		12h.,	30m.				
179 59	65.7	60.2	65.2	61.6	59.0	59.9	61.93
	65.0	61.0	66.2	61.0	60.2	58.1	61.92
	65.3	61.5	66.2	61.9	61.0	58.9	62.47
C.	64.7	60.3	65.3	61.0	60.2	58.1	61.67
	65.0	61.1	65.8	61.6	60.6	58.1	62.03
	64.4	60.8	65.2	61.1	60.6	57.5	61.58
Means	65.02	60.80	65.72	61.37	60.27	58.43	61.993 —.130
April 25.		2h.,	30m.				
179 59	66.1	62.2	66.1	62.1	61.3	60.2	63.00
	65.5	62.0	66.2	61.5	61.0	59.9	62.68
	65.3	61.9	66.2	61.0	60.1	59.4	62.32
	65.4	62.1	66.1	61.1	61.6	59.9	62.70
C.	65.2	62.1	65.6	61.1	61.2	59.9	62.52
	64.0	62.5	65.6	60.9	61.9	58.6	62.25
	65.1	61.9	65.4	61.1	60.9	59.9	62.38
	65.0	62.1	65.2	61.1	61.1	59.8	62.38
Means	65.20	62.10	65.80	61.24	61.14	59.70	62.527 —.132
April 27.		2h.,	30m.				
179 59	65.2	63.3	66.6	66.0	59.6	59.4	63.35
	63.2	64.2	67.6	64.3	62.5	56.2	63.00
	64.2	62.5	66.0	65.4	58.5	58.5	62.52
P.	62.4	63.2	67.0	64.0	60.8	56.0	62.23
	63.3	62.8	67.0	65.0	60.0	57.5	62.60
	62.7	62.5	65.0	64.2	59.0	57.0	61.73
Means	63.50	63.08	66.53	64.82	60.07	57.43	62.572 —.131

THERMOMETERS.

R POINTS.	Stone.	Upper.	Lower.
	°	°	°
22, No. 1	65.0	73.5	70.5
" " 2	66.5	67.0	66.0
23, " 1	65.5	68.2	66.5
		68.5	67.0
25, " 1	69.0	75.0	71.5
		75.9	71.4
27, " 1	62.0	64.0	62.5

2. Correction of S. Cusp. for defective illumination, +0″.84.
3, 25 to 37. Atmosphere hazy.
18. Very much obscured.
39. Correction of S. Cusp. for defective illumination, +0″.92.
40 to 46. Observed during eclipse of Sun.
40 to 43, 45, 46. Observed at times of transit: instrumental reductions and refraction only applied.
44. Reduction applied for parallax and semi-diameter, —9′ 1″.75.
40. Observed on micrometer wire (2): reduction of reading to (3) —0r.0312.
41. " " " " " " .0323.
42. " " " " " " .0335.
43. " " " " " " .0346.
48. Correction of S. Cusp. for defective illumination, +0″.94.
49 to 51. Very unsteady.
Nadir Point, April 25. Determination difficult; wind fresh.

DATE. 1846.		No. for ref.		OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMET			
									A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up
					No.	M. S.	°	′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
April	26	1		Polaris, (Mic.)	4	— 1 27.1										29.477					
		2				+ 0 15.9										.476					
		3				2 15.9										.476					
		†4				4 15.9										.503					
		5				6 15.9										.520					
		6				8 15.9										.541					
		†7				+ 9 59.9	310	24	59.0	57.3	63.4	59.0	56.3	50.6	57.60	.560	29.954	58.5	62.2		62.
	27	†8		Sun, S. L. (Mic.)	1	— 0 47.0	25	14	61.5	59.0	63.8	61.7	55.8	52.3	59.02	27.920	29.942	60.4	63.6	62.0	63.
		†9		Sun, N. L.	4	. . .	24	45	19.0	16.7	21.4	20.6	13.7	10.7	17.02	. .					
		10	κ	Orionis	4	. . .	48	36	35.9	36.0	37.9	41.9	30.5	31.6	35.63	. .	29.884	62.0	64.7	61.8	65.
		11		Polaris, S. P., (Mic.)	4	3 52.1	307	24	59.8	59.6	62.8	62.0	58.4	54.4	59.50	30.712	29.910	59.0	51.4	61.5	56.
		12				1 52.1										.711					
		13				— 0 12.1										.698					
		14				+ 1 47.9										.696					
		15				3 47.9										.686					
		16				5 47.9										.680					
		17				7 47.9										.660					
		18				+ 9 25.9										.633	29.906	58.6	49.5		
	29	†19		Polaris	3†	— 8 14.0	310	25	24.9	27.0	28.7	28.8	23.8	19.4	25.43	. .	29.750	61.5	65.5	60.5	63
		20			4†	+ 0 59.0			28.1	31.0	33.9	32.1	27.1	23.7	29.32	. .					
		21				4 16.0			27.9	30.1	34.0	31.7	26.4	23.0	28.85	. .					
		†22				+ 8 10.0			25.0	27.1	30.2	29.2	23.0	20.0	25.75	. .	29.750	62.0	66.8		63
	30	23		Sun, S. L. (Mic.)	1	— 0 46.2	24	20	45.2	46.2	47.6	48.1	42.6	37.8	44.58	29.766	29.746	64.0	72.2	60.5	67
		24			2	0 30.2	"	"	"	"	"	"	"	"	"	.778					
		25			3	— 0 14.2	"	"	"	"	"	"	"	"	"	.779					
		26		Sun, N. L.	5	+ 0 17.8	23	48	65.0	66.0	65.9	67.0	62.1	58.6	64.10	. .					67
		27		(Mic.)	6†	0 37.8	"	"	"	"	"	"	"	"	"	29.980					
		28		(Mic.)	7†	+ 0 51.8	"	"	"	"	"	"	"	"	"	.978					
		29	κ	Orionis	4	. . .	48	36	38.9	36.5	38.6	39.2	34.1	33.8	36.85	. .	29.648	68.5	76.0	61.0	72.
		30		Polaris	3†	— 9 16.7	310	25	25.8	25.7	28.0	27.0	22.0	20.6	24.85	. .	29.638	65.5	69.5	63.8	66.
		31		(Mic.)		5 20.7										29.959					
		32		(Mic.)		4 33.7										.940					
		33		(Mic.)		4 10.7										.948					
		34		(Mic.)		3 45.7										.949					
		†35				— 3 17.7			31.0	30.8	35.0	32.0	26.6	25.0	30.07	. .					
		36			4†	+ 0 52.3			30.1	29.9	33.0	31.2	25.8	25.9	29.32	. .			68.8		67.
		†37			5†	10 33.3			24.8	24.0	27.0	25.3	21.7	19.1	23.65	. .					67.
		38		(Mic.)		12 19.3										30.033					
		39		(Mic.)		12 59.3										.061					
		40		(Mic.)		13 19.3										.069					
		41		(Mic.)		13 43.3										.070					
		42		(Mic.)		+14 9.3										.079	29.638	65.8	70.4		
May	1	43		Sun, S. L. (Mic.)	2	— 0 31.6	24	2	31.4	30.4	32.0	32.0	26.1	24.6	29.42d	29.802	29.630	67.5	79.5		70
		44			3	0 17.6	"	"	"	"	"	"	"	"	"	.780					
		45				— 0 3.6	"	"	"	"	"	"	"	"	"	.792					
		46			4†	+ 0 10.4	"	"	"	"	"	"	"	"	"	.781					
		47		Sun, N. L.	5†	0 21.4	23	30	55.4	55.9	55.9	56.0	53.4	49.5	54.35	. .					70
		48		(Mic.)	6†	0 33.4	"	"	"	"	"	"	"	"	"	30.012					
		49		(Mic.)	7†	+ 0 54.4	"	"	"	"	"	"	"	"	"	.059					
	2	50		Sun, S. L. (Mic.)	1	— 0 47.7	23	44	40.4	41.0	41.8	43.0	36.2	34.0	39.40	29.947	29.716	62.0	64.6	65.0	64
		51			2	0 30.7	"	"	"	"	"	"	"	"	"	.927					
		52			3	— 0 15.7	"	"	"	"	"	"	"	"	"	.947					

DATE.			MICROMETER.		OBSERVED SEMI-DIAMETERS.		
			Coincid.	Val. 1 r.	Objects.	No.	Semi-diam.
			revs.	″			′ ″
April	26,	1h.	30.006	62.75			
"	27,				Sun	8	15 56.40
"	30,	5h.	29.999		Sun	23	15 56.61
May	1,	3h.	30.002		Sun	43	15 54.66
"	2,	5h.	30.003		Sun	50	15 55.01

April 27. Error of Runs +0″.65. Temp. of circle 65° ; of stone 65°
April 30. do. do. .39 do. do. 67° do. 61°
May 1. do. do. .29 do. do. 68° do. 64°
May 2. do. do. .58 do. do. 65° do. 65°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMET			
							A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up
			No.	M. s.	°	′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
May 2	1	Sun, N. L. (Mic.)	5	+ 0 17.3	23	12	54.5	54.4	55.2	55.5	51.3	47.1	53.00*d*	30.021				65.0	65.
	2		6	0 33.3	"	"	"	"	"	"	"	"	"	29.994					
	3		7	+ 0 50.3	"	"	"	"	"	"	"	"	"	30.021					
	4	δ Hydræ et Crateris	4	. . .	52	49	34.1	32.9	34.2	38.0	26.9	28.2	32.38	. .	29.790	64.0	58.3	64.8	63.
	†5	β Leonis	4	. . .	23	27	33.2	31.4	33.9	34.8	26.6	26.7	31.13*d*	30.028	29.794	63.2	58.2		62.
	6	γ Ursæ Majoris	4	. . .	344	20	58.0	54.5	60.6	57.9	55.6	52.1	56.45	. .	29.794	63.0	58.1		62.
	†7	Canum Venat, 4345, (Mic.)	4	. . .	,,	,,	,,	,,	,,	,,	,,	,,	,,	29.790					
	8	12 Canum Venat,	4	. . .	359	44	44.4	42.0	46.2	47.4	39.1	38.0	42.85	. .	29.794	62.5	55.7	64.8	61.
	9	Polaris, S. P.	5†	− 9 4.8	307	24	18.4	17.0	21.6	19.8	15.8	13.0	17.60	. .	29.794	62.5	56.2		60.
	10	(Mic.)		3 34.8										30.072					
	11	(Mic.)		2 59.8										.064					
	12	(Mic.)		2 39.8										.070					
	13	(Mic.)		2 4.8										.088					
	14			− 1 42.8			14.2	11.1	16.0	15.1	11.0	8.0	12.57	. .					
	15		4†	+ 0 17.2			13.4	10.8	15.9	13.8	10.1	7.4	11.90	. .			56.2		60.
	16			4 36.2			15.0	12.5	17.0	16.0	11.8	9.1	13.57	. .					
	17	(Mic.)		8 10.2										29.970					
	18	(Mic.)		8 40.2										.970					
	19	(Mic.)		9 10.2										.964					
	20	(Mic.)		9 36.2										.941					
	21		3	+ 9 56.2			19.4	17.3	21.7	20.9	16.4	13.4	18.18	. .	29.792	62.2	56.2		60.
	22	α Virginis	5	. . .	49	14	10.2	10.0	12.0	12.8	9.1	4.2	9.72	. .	29.792	62.2	56.2		59.
	23	η Ursæ Majoris	4	. . .	348	48	56.0	56.1	61.0	58.0	56.1	48.6	55.97	. .	29.794	62.0	55.7		59.
	24	η Bootis	4	. . .	19	43	13.0	10.1	13.0	14.0	9.1	4.3	10.58	. .			55.5		59.
	25	α Bootis	4	. . .	18	54	20.2	18.5	21.5	22.4	16.4	12.5	18.58	. .	29.790	61.0	55.8	64.5	59.
4	26	Sun, S. L., (Mic.)	1	− 0 47.0	23	9	60.3	57.7	60.4	58.8	55.8	52.0	57.50	30.408	30.101	69.0	75.5	63.5	70.
	27	Sun, N. L.	4	. . .	22	37	41.5	39.0	43.7	41.0	36.2	35.1	39.40*d*	. .					
	28	Polaris, S. P., (Mic.)	5	− 9 46.4	307	24	61.0	57.2	62.8	59.0	57.8	55.0	58.80	30.680	30.090	67.0	60.5	65.0	
	29			7 46.4										.697					
	30			5 46.4										.716					
	31			3 46.4										.732					
	32			1 46.4										.744					
	33		4	− 0 4.4										.750					
	34			+ 1 55.6										.743					
	35			3 55.6										.730					
	36			5 55.6										.720					
	37			7 55.6										.700					
	38			+ 9 38.6										.674		66.5	60.0		66.
5	†39	Sun, N. L., (Mic.)	1	− 0 46.9	22	20	16.8	15.0	17.4	15.5	13.2	8.9	14.47	29.747					71.
	40		2	30.9	"	"	"	"	"	"	"	"	"	.748					
	41		3	− 0 13.9	"	"	"	"	"	"	"	"	"	.740					
	42	Sun, S. L., (Mic.)	5†	+ 0 19.1	22	52	22.7	21.6	23.5	22.7	18.5	16.9	20.98*d*	30.098	30.100	69.5	76.2	65.0	71.
	43		6†	36.1	"	"	"	"	"	"	"	"	"	.109					
	†44		7†	+ 0 50.1	"	"	"	"	"	"	"	"	"	.109					
	45	Polaris	3†	− 9 21.6	310	25	22.9	27.0	33.0	28.8	23.5	29.6	27.47	. .	29.972	67.5	74.0	66.0	71.
	46	(Mic.)		5 18.6										29.950					
	47	(Mic.)		4 50.6										.949					
	†48	(Mic.)		4 28.6										.959					
	49			3 8.6			34.0	31.8	37.2	32.0	28.0	26.2	31.53	. .					
	50		4	+ 0 1.4			34.0	31.1	37.0	33.0	27.0	27.2	31.55	. .			74.5		70.
	51			4 2.4			33.0	29.5	36.1	31.8	26.0	26.3	30.45	. .					
	52	(Mic.)		7 26.4										30.039					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r.*	Objects.	No.	Semi-diam.
	revs.	″			′ ″
May 4, 3*h.*	30.002	62.75	Sun . .	26	15 56.52
" 5, 2*h.*	30.002		Sun . .	39	15 52.84

May 4. Error of Runs —0″.60. Temp. of circle 65°; of stone 65°
May 5. do. do. .33 do. do. 70° do. 65°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 0.81	+0 20.75					C.
1.29						
0 0.12						
0 0.07	1 14.91	52 50 47.22	62.11	− 13 57 5.86	−56.21	
0 0.80	+0 24.71	23 27 55.04		+ 15 25 46.32	67.44	
0 0.16	−0 15.96	344 20 40.65		+ 54 33 0.71	77.62	
-0 13.13	0 0.25	359 44 55.73		+ 39 8 45.63	71.56	
-0 0.05	0 0.25	359 44 42.55		+ 39 8 58.81	−71.56	
4.34	1 14.61	307 22 58.65		+ 88 29 16.44	+78.58	
5.15	.61	57.84				
4.46	.61	58.53				
4.74	.61	58.25				
5.71	.61	57.28				
0.25	.61	57.71				
0.11	.60	57.19				
1.19	.60	57.78				
1.69	.60	57.28				
2.13	.60	56.84				
2.22	.60	56.75				
1.20	.60	57.77				
5.03	−1 14.60	58.55				
0.17	+1 6.21	49 15 15.76		− 10 21 34.40	−61.00	
0.18	−0 11.31	348 48 43.48		+ 50 4 57.88	67.46	
0.30	+0 20.51	19 43 30.79		+ 19 10 10.57	63.15	
0.12	0 19.59	18 54 38.05		+ 19 59 3.31	−65.98	
−0 25.53	0 20.48	22 53 55.93	62.16	+ 15 59 45.48		P.
+0 0.07	+0 19.95					
−0 47.34	−1 14.71	307 22 56.75	62.22	+ 88 29 15.79	+79.11	
46.62	.72	57.46				
46.44	.73	57.63				
46.48	.73	57.59				
46.69	.74	57.37				
46.92	.75	57.13				
46.69	.76	57.35				
46.49	.77	57.84				
46.90	.77	57.13				
47.09	.78	56.93				
−0 47.02	−1 14.79	56.99				
+0 15.75	+0 19.63	22 36 42.85	62.46	+ 16 16 58.86		C.
15.68						
+0 16.29						
−0 5.47	+0 20.16					
5.64						
−0 5.24						
+0 4.57	−1 5.12	310 24 26.92	62.76	+ 88 29 15.36	+79.51	
4.70	.09	27.08				
4.54	.09	26.92				
3.74	.08	26.13				
0.56	.08	27.01				
0.04	.05	26.54				
0.88	.06	26.27				
0.70	.06	26.09				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
	May 2.	12h.					
179° 59′	61″9	62″7	65″1	64″9	61″0	55″1	61″78
	63.4	62.2	64.8	65.2	60.1	56.9	62.10
	62.2	63.6	66.0	65.4	62.0	55.5	62.45
C.	63.0	62.8	66.0	65.0	61.1	56.9	62.47
	63.0	63.1	65.9	65.9	61.0	56.6	62.58
	62.8	63.0	65.2	65.0	60.4	56.0	62.07
Means	62.72	62.90	65.50	65.23	60.93	56.17	62.242 —.130
	May 4.	3h.					
179 59	65.8	61.3	67.0	62.8	59.7	58.8	62.57
	63.2	62.4	67.0	60.5	62.2	55.5	61.80
	65.3	61.6	67.0	63.0	60.3	58.6	62.63
P.	63.4	62.6	67.4	61.3	62.0	56.0	62.12
	65.2	62.0	67.4	62.0	61.0	56.6	62.02
	63.8	62.0	67.4	61.3	61.0	56.6	62.02
Means	64.45	61.98	67.20	61.82	61.03	57.25	62.289 —.130
	May 4.	13h.,	20m.				
179 59	64.6	60.5	66.5	62.7	60.6	58.0	62.15
	62.7	62.4	67.4	62.2	63.3	56.4	62.40
P.	63.7	61.8	67.2	62.6	62.5	56.8	62.43
	63.7	61.8	67.2	62.6	62.5	56.8	62.43
Means	63.68	61.62	67.08	62.52	62.22	57.00	62.354 —.130
	May 6.	3h.					
179 59	64.0	63.9	68.0	62.1	63.0	55.9	62.82
	64.8	63.0	67.0	62.4	61.6	57.0	62.63
	64.7	64.0	67.9	63.0	62.4	57.6	63.27
C.	64.7	63.9	68.0	62.6	62.0	57.5	63.12
	64.1	63.6	67.6	62.8	62.1	57.2	62.90
	63.9	63.2	67.6	62.2	61.9	56.7	62.58
Means	64.37	63.60	67.68	62.52	62.17	56.98	62.886 —.130

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
2, No. 2	64.8	61.8	62.4
		63.3	64.5
4, " 1	63.5	70.0	67.0
" 2	65.0	67.0	65.0
6, " 1	66.1	73.7	70.7
		74.2	69.7

5. Observed between fixed and micrometer wires.
7. Precedes 12 Can. Ven., 1s.27, (6 wires.)
39 to 44. Zenith Point interpolated.
48. Interrupted by clouds.
Nadir Point, May 6. Apparent error of collimation, 5″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.		Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMET At.	Ext.	St.	U
				No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	
May 5	1	Polaris . . .	(Mic.)		− 7 56.4								30.052					
	2		(Mic.)		8 26.4								.051					
	3		(Mic.)		8 54.4								.061					
	4		(Mic.)		9 26.4								.070					
	5			5	+10 6.4	310 25 29.4	25.4	31.6	27.8	21.8	23.5	26.58	. .	29.970	68.5	74.4		70.
11	6			5†	− 9 33.1	307 24 17.2	17.4	21.1	19.1	15.7	10.9	16.90	. .	29.800	59.2	50.6	64.0	57.
	7		(Mic.)		4 25.1								30.082					
	8		(Mic.)		3 55.1								.090					
	9		(Mic.)		3 25.1								.091					
	10		(Mic.)		3 2.1								.098					
	11				− 2 52.1	13.2	13.0	17.1	14.9	11.1	6.6	12.65	. .					
	12	Polaris, S. P. .		4	+ 0 8.9	12.1	11.1	15.2	13.1	9.2	5.0	10.95	. .			51.4		56.
	13				3 42.9	13.1	12.9	17.1	15.0	11.1	6.1	12.55	. .					
	14		(Mic.)		6 52.9								29.978					
	15		(Mic.)		7 22.9								.978					
	16		(Mic.)		7 52.9								.978					
	17		(Mic.)		8 22.9								.971					
	18			3	+ 9 41.9	17.0	17.2	21.1	19.5	15.4	10.2	16.73	. .	29.808	58.5	51.4		56.
	19	η Ursæ Majoris		4	. . .	348 48 53.5	54.3	59.9	56.6	52.8	47.0	54.02	. .	29.808	58.0	51.0	64.0	55.
	20	η Bootis		4	. . .	19 43 10.4	10.0	8.6	13.1	13.6	1.9	9.60	. .			50.9		56.
	21	α Bootis		5	. . .	18 54 17.5	17.1	20.1	19.9	14.4	8.6	16.27	. .	29.818	57.5	49.6		55.
	†22	β Ursæ Minoris		4	. . .	324 7 20.4	19.5	24.3	23.8	16.7	14.9	19.93*d*	. .	29.840	58.0	48.6		61.
	23	β Libræ		4	. . .	47 41 23.0	22.9	26.5	26.8	20.0	15.0	22.37	. .	29.838	58.0	47.4		58.
	24	α Serpentis		4	. . .	31 58 17.3	19.2	20.0	21.1	15.8	11.0	17.40	. .	29.834	57.2	46.6		54.
	25	ζ Ursæ Minoris		4	. . .	320 38 35.7	36.9	43.0	38.9	32.8	28.9	36.03	. .			45.5		55.
	26	β^1 Scorpii		5	. . .	58 14 51.0	55.1	56.7	57.8	51.6	46.5	53.12	. .			45.0		55.
	27	β^2 Scorpii, (Mic.) . . .		5	. . .	" " "	"	"	"	"	"	"	30.218					
	28			1	− 0 46.5	58 34 21.4	25.6	26.6	28.6	20.5	17.2	23.32	29.520	29.828	56.1	44.9		
	29	Moon, S. L. (Mic.) . .		2	0 30.4	" " "	"	"	"	"	"	"	.510					
	30			3	− 0 15.1	" " "	"	"	"	"	"	"	.488					
	31			5	+ 0 15.7	58 2 38.3	42.0	44.0	45.6	37.1	34.1	40.18*d*	30.089					56.
	32	Moon, N. L. (Mic.) . .		6	0 32.9	" " "	"	"	"	"	"	"	.059					
	33			7	+ 0 47.3	" " "	"	"	"	"	"	"	.059					
	34	η Draconis		4	. . .	337 2 19.5	18.6	24.6	22.2	16.5	12.0	18.90*d*	. .	29.830	56.0	44.6		55.
	†35			3	− 9 29.0	310 24 65.7	65.6	70.5	65.6	64.0	57.4	64.80	20.586	29.862	59.0	64.6	61.0	
	36				7 29.0								.560					
	37				5 29.0								.538					
	38				3 29.0								.524					
	39				− 1 29.0								.512					
	40	Polaris, (Mic.) . . .		4	+ 0 9.0								.515					
	41				3 9.0								.523					
	42				4 9.0								.534					
	43				6 9.0								.543					
	44				8 9.0								.560					
	†45			5†	+10 3.0								.585		60.0	66.0		63.
12	46	Sun, S. L.		4	. . .	20 59 36.5	36.2	39.4	40.4	31.8	30.5	35.80	. .	29.856	62.4	68.3	61.0	66.
	47	α Ursæ Majoris		4	. . .	336 19 15.2	11.8	19.2	11.5	13.2	6.0	12.82	. .	29.870	65.5	64.2		67.
	48	δ Leonis		4	. . .	17 31 36.2	32.4	39.7	36.7	30.2	27.2	33.73	. .					
	49	δ Hydræ et Crateris . .		4	. . .	52 49 36.2	31.6	37.4	37.5	27.7	28.7	33.18	. .	29.878	65.3	62.4		65.
	50	γ Cephei, S. P.		4	. . .	295 44 58.4	52.2	59.8	57.7	55.0	51.0	55.68	. .					
	51	β Leonis		4	. . .	23 27 33.0	28.0	34.0	33.2	25.4	24.7	29.72	. .					
	52	γ Ursæ Majoris		4	. . .	344 20 57.6	52.2	59.8	55.3	53.7	49.7	54.72	. .	29.892	65.0	60.5		63.

DATE.	MICROMETER. Coincid.	Val. 1*r*.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
May 11, 16*h*.	30.006	62.75	Moon .	28	16 3.29
" 11, 2*h*.	30.006				

May 11. Error of Runs — 1″.05. Temp. of circle 59°; of stone 64°
May 12. do. 0.60 do. do. 65° do. 65°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
nstrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
+0 0.31	— 1 5.06	310 24 25.70				C.
0.80	.06	26.19				
0.59	.06	25.98				
0.56	.06	25.95				
+0 5.32	1 5.06	26.84				
—0 4.86	1 15.42	307 22 56.62				
5.78	.35	55.77				
6.07	.34	55.49				
5.95	.33	55.62				
6.26	.33	55.31				
0.57	.32	56.76				
0.15	.31	55.49	61.49	+ 88 29 15.37	+80.95	
0.85	.31	56.39				
0.88	.32	56.35				
1.25	.32	55.98				
1.66	.33	55.56				
1.65	.33	55.57				
5.00	1 15.33	56.40				
0.21	— 0 11.42	348 48 42.39		+ 50 4 58.35	—69.86	
0.17	+ 0 20.71	19 43 30.14		+ 19 10 10.60	64.60	
—0 0.11	+ 0 19.84	18 54 36.00		+ 19 59 4.74	67.49	
+0 0.03	— 0 41.99	324 6 37.97		+ 74 47 2.77	58.35	
+0 0.30	+ 1 3.85	47 42 26.52		— 8 48 45.78	47.27	
—0 0.35	+ 0 36.36	31 58 53.41		+ 6 54 47.33	41.35	
0.30	— 0 47.87	320 37 47.86		+ 78 15 52.88	41.35	
0.20	+ 1 34.18	58 16 27.10		— 19 22 46.36	37.93	
—0 13.34	+ 1 34.16	58 16 13.94		— 19 22 33.20	38.19	
+0 32.86	—48 14.17	57 30 38.97		— 18 36 58.23		
32.74						
+0 33.35						
—0 5.98	47 58.54					
5.24						
—0 6.26						
+0 0.02	0 24.79	337 1 54.13		+ 61 51 46.61	—29.34	
31.02	1 6.11	310 24 29.71				
30.92	6.09	29.63				
30.98	6.07	29.71				
30.96	6.06	29.70				
31.23	6.04	29.99				
30.95	6.02	29.73	62.89	+ 88 29 12.26	+81.06	P.
30.70	6.00	29.50				
30.67	5.98	29.49				
31.19	5.96	30.03				
31.61	5.94	30.47				
-0 31 83	1 5.92	30.71				
-0 0.05	15 32.15	20 44 3.60		+ 18 9 38.54		
-0 0.08	— 0 24.74	336 18 48.00	62.56	+ 62 34 53.81	—78.94	
-0 0.17	+ 0 17.86	17 31 51.76		+ 21 21 50.05	68.12	
-0 0.05	+ 1 14.55	52 50 47.68		— 13 57 5.87	—56.20	
-0 0.23	— 1 57.40	295 39 58.51		+ 76 46 16.70	+86.51	
0.34	+ 0 24.66	23 27 54.72		+ 15 25 47.09	—68.46	
-0 0.11	— 0 15.94	344 20 38.89		+ 54 33 2.92	—79.46	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
May 11.		14h.,	20m.				
179° 59′	61″5	63″2	65″5	66″0	58″8	54″9	61″65
	60.2	64.1	66.5	65.6	60.4	54.1	61.82
	60.1	63.9	66.0	65.5	60.5	54.0	61.67
C.	60.1	63.9	65.2	65.2	60.5	53.2	61.35
	60.3	63.1	65.5	65.0	59.4	53.9	61.20
	60.7	64.0	66.1	65.9	61.0	54.4	62.02
Means	60.48	63.70	65.80	65.53	60.10	54.08	61.617 —.128
May 12.		3h.,	30m.				
179 59	66.2	62.4	68.5	65.0	58.7	58.5	63.22
	65.0	62.8	68.8	64.0	61.2	55.6	62.90
	65.0	62.8	68.8	64.0	61.2	55.6	62.90
P.	64.7	63.5	69.0	64.0	61.6	55.5	63.05
	63.0	63.3	69.0	64.0	61.6	56.0	63.15
	64.3	63.3	68.5	64.0	61.2	56.0	62.88
Means	65.03	63.02	68.77	64.17	60.92	56.20	63.017 —.127
May 12.		12h.					
179 59	64.5	61.4	68.7	63.0	62.2	55.6	62.57
	64.6	62.3	68.7	63.0	63.3	55.6	62.92
	65.0	61.5	68.0	63.5	62.2	55.6	62.63
P.	65.0	61.5	68.3	63.5	62.3	55.6	62.70
	64.7	61.5	68.3	63.5	62.3	55.6	62.65
	64.7	61.5	68.3	63.5	62.3	55.6	62.65
Means	64.75	61.62	68.38	63.33	62.43	55.60	62.686 —.127

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
11, No. 1	64.0	56.0	58.0
		60.3	60.5
12, " 1	61.0	67.0	62.5
" 2	62.0	64.5	63.0

22. Very unsteady.
35 to 45. Faint and unsteady.
Nadir Point, May 11. Apparent error of collimation, 5″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMETERS. At.	Ext.	St.	Up.	Lo
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°	°
May 12	1	β Corvi	4	. . .	61 24 59.6	56.0	61.8	58.3	55.8	51.0	57.08	. .	29.914	64.0	59.0			63.
	2			− 9 42.9	307 24 55.7	52.3	58.4	54.3	52.6	47.0	53.38	30.607	29.924	63.5	58.0	62.0		
	3			7 42.9								.645						
	4			5 42.9								.653						
	5			3 42.9								.667						
	6			− 1 42.9								.675						
	7	Polaris, S. P., (Mic.) .	4	+ 0 1.1								.682						
	8			2 1.1								.672						
	9			4 1.1								.668						
	10			6 1.1								.654						
	11			8 1.1								.635						
	12			+ 9 38.1								.612	29.926	63.0	56.6		60.5	[illegible]
	13	η Ursæ Majoris	4	. . .	348 48 55.5	54.0	62.0	56.2	55.5	46.2	54.90	. .	29.928	63.0	56.3		59.5	[illegible]
	14	α Bootis	4	. . .	18 54 19.2	17.3	22.3	19.4	16.3	8.0	17.08	. .	29.928	61.0	55.0		59.5	[illegible]
13	15		1	− 0 46.5	20 44 33.4	34.9	36.4	37.0	30.1	25.1	32.82	29.916	30.100	63.8	70.5		68.0	[illegible]
	16	Sun, S. L., (Mic.) . .	2	0 30.5	" " "	"	"	"	"	"	"	.900						
	17		3	− 0 14.5	" " "	"	"	"	"	"	"	.900						
	18		5†	+ 0 18.5	20 12 56.6	57.7	60.7	58.5	56.0	47.4	56.15*d*	. .				61.5	69.2	[illegible]
	19	Sun, N. L. . (Mic.)	6†	0 35.5	" " "	"	"	"	"	"	"	30.010						
	20	(Mic.)	7†	+ 0 52.5	" " "	"	"	"	"	"	"	.000						
	21	γ Cephei, S. P.	4	. . .	295 41 55.6	51.1	58.0	53.9	55.1	48.0	53.62	. .	30.016	71.0	69.7	64.7	71.5	[illegible]
	22	γ Ursæ Majoris	4	. . .	344 20 57.5	51.9	59.9	53.6	54.9	50.1	54.65	. .	30.028	71.0	68.9		70.3	[illegible]
	†23	β Corvi, (Mic.)		. . .	61 24 55.1	52.9	58.4	52.7	52.9	48.0	53.33	29.914	30.034	70.2	68.0		69.5	[illegible]
	24	α Cassiopeiæ, S. P. . . .	4	. . .	274 44 57.6	52.9	60.8	56.8	54.0	50.2	55.38	. .	30.036	70.0	67.9		69.5	[illegible]
	†25	Polaris, S. P.	5	−10 3.5	307 24 16.0	12.9	19.4	12.2	14.4	9.0	13.98	. .	30.040	70.0	67.7		69.4	[illegible]
	†26		4	0 10.5	11.6	7.1	13.9	7.0	9.0	4.8	8.90	. .			68.2		69.5	[illegible]
	27	α Virginis	4	. . .	49 14 14.7	11.0	15.1	11.6	12.0	8.0	12.07	. .	30.038	69.9	69.0	65.0	70.1	[illegible]
18	28		3	9 28.7	310 24 64.5	60.7	68.2	63.0	59.2	56.2	61.97	29.498	30.146	60.0	56.2	68.0	59.0	[illegible]
	29			7 28.7								.475						
	30			5 28.7								.452						
	†31			3 28.7								.440						
	32			− 1 28.7								.436						
	33	Polaris, (Mic.)	4	+ 0 11.3								.433						
	34			2 11.3								.438						
	35			4 11.3								.448						
	36			6 11.3								.464						
	37			8 11.3								.485						
	38		5	+ 9 55.3	63.6	61.3	68.2	62.5	59.3	55.3	61.70	.515	30.144	58.5	56.5		57.5	58.
19	†39	Sun, S. L., (Mic.) . .	1	− 0 47.0	19 19 60.0	61.3	66.5	63.8	60.0	52.0	60.60	28.283	30.132	61.0	61.5		62.0	
	†40	Sun, N. L.	4	. . .	18 49 68.2	66.0	71.7	69.0	65.0	58.2	66.35	. .						
	41	γ Cephei, S. P.	4	. . .	295 41 58.6	55.3	62.0	60.5	56.0	50.3	57.12	. .	30.050	63.0	57.0		63.0	63.
	42	β Leonis	4	. . .	23 27 31.0	29.5	33.9	33.3	24.3	23.1	29.18*d*	. .		62.5	56.0	67.0	63.0	
	43	β Corvi	4	. . .	61 24 55.2	54.8	60.0	57.5	51.3	46.7	54.25	. .	30.060	61.3	53.3		61.0	
	†44	α Cassiopeiæ, S. P. . . .	4	. . .	274 45 16.3	16.0	22.3	22.0	14.0	8.7	16.55	. .						
	45		5	− 9 39.7	307 25 8.0	6.6	13.4	8.7	6.0	0.0	7.12	30.830	30.068	61.0	53.0	66.0	60.0	61.
	46			7 39.7								.860						
	47			5 39.7								.870						
	48			3 39.7								.888						
	49	Polaris, S. P., (Mic.) .		− 1 39.7								.897						
	50		4	+ 0 2.3								.907						
	51			2 2.3								.907						
	52			4 2.3								.896						

DATE.	MICROMETER. Coincid.	Val. 1 r.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
May 13, 4*h*.	30.003	62.75	Sun . .	15	15 51.07
" 19, 4*h*.	30.006		Sun . .	39	15 51.42

May 13. Error of Runs —0″.37. Temp. of circle 69°; of stone 65°
May 19. do. do. .68 do. do. 60° do. 65°

Assumed Latitude 38° 53′ 39″.25 North.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.01	+ 1 44.35	61 26 41.42	62.56	— 22 32 59.61	—59.73	P.
42.45	— 1 14.67	307 22 56.26		+ 88 29 14.33	+81.16	
43.07	.69	55.62				
42.21	.71	56.46				
42.13	.73	56.52				
42.10	.76	56.52				
42.41	.78	56.19				
42.01	.80	56.57				
42.39	.82	56.17				
42.57	.84	55.97				
42.84	.86	55.68				
42.87	1 14.88	55.63				
0.17	— 0 11.35	348 48 43.38		+ 50 4 58.43	—70.11	
—0 0.11	+ 0 19.71	18 54 36.68		+ 19 59 5.13	—67.66	
+0 5.00	0 18.30	20 29 5.78	62.09	+ 18 24 35.56		C.
6.04						
6.18						
0.33	+ 0 17.79					
0.44						
1.53						
0.13	— 1 55.92	295 39 57.83		+ 76 46 16.49	+86.56	
0.05	— 0 15.74	344 20 38.96		+ 54 33 2.38	—79.62	
+0 5.58	+ 1 42.90	61 26 41.81		— 22 33 0.47	—59.68	
0.00	— 9 54.42	274 35 0.96		+ 55 41 19.62	+84.28	
—0 5.30	1 13.53	307 22 55.15		+ 88 29 13.91	+81.33	
0.07	— 1 13.47	.36				
—0 0.05	+ 1 5.09	49 15 17.11		— 10 21 35.77	—61.04	
+0 36.59	— 1 7.81	310 24 30.61	62.86	+ 88 29 11.85	+82.38	P.
36.29	.81	.31				
36.40	.80	.43				
36.24	.80	.27				
36.00	.79	.04				
36.11	.79	.15				
36.05	.79	.09				
36.09	.79	.13				
36.18	.78	.23				
36.38	.78	.43				
36.14	— 1 7.78	.19				
1 48.08	+ 0 17.34	19 6 14.60		+ 19 47 27.51		
0 0.01	+ 0 16.82					
0.26	— 1 59.02	295 39 58.36	62.59	+ 76 46 16.52	+87.00	
+0 0.06	+ 0 25.03	23 27 54.27		+ 15 25 47.57	—69.15	
-0 0.01	+ 1 46.00	61 26 40.24		— 22 32 58.40	—59.48	
-0 0.04	—10 13.91	274 35 2.68		+ 55 41 20.84	+84.70	
-0 56.50	— 1 15.74	307 23 54.88		+ 88 29 12.95	+82.49	
56.60	.75	54.77				
55.86	.76	55.50				
56.04	.77	55.31				
56.08	.77	55.27				
56.58	.78	54.76				
56.81	.79	54.52				
56.77	.79	54.56				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
May 13.		13*h*.,	30*m*.				
179° 59′	62″6	62″0	66″9	59″9	63″2	54″9	61″58
	62.9	62.4	67.6	60.6	63.4	55.1	62.00
	63.3	63.1	67.9	60.5	63.9	55.3	62.33
C.	64.0	62.4	67.5	61.1	63.4	56.0	62.40
	64.3	63.0	67.8	61.4	63.7	56.2	62.73
	63.8	62.8	66.8	61.2	63.2	56.0	62.30
Means	63.48	62.62	67.42	60.78	63.47	55.58	62.225 —.131
May 18.		2*h*.					
179 59	63.7	62.6	67.8	65.8	58.5	56.0	62.40
	62.4	65.2	69.6	65.0	62.7	53.4	63.05
	63.7	63.7	68.3	66.4	59.0	55.5	62.77
P.	62.4	65.4	69.4	65.8	62.8	54.3	63.35
	63.4	64.8	68.3	66.0	60.7	55.0	63.03
	63.0	64.8	68.8	66.5	61.6	55.0	63.28
Means	63.10	64.42	68.70	65.92	60.88	54.87	62.981 —.125
May 19.		12*h*.					
179 59	64.0	62.3	68.3	65.8	59.5	56.3	62.70
	62.7	63.4	69.2	64.0	62.2	54.0	62.58
	63.7	63.2	68.8	66.2	60.6	55.3	62.97
P.	62.3	64.0	69.3	64.0	62.7	53.5	62.63
	63.5	63.0	69.0	65.2	61.0	55.0	62.78
	63.2	63.0	68.8	65.2	60.7	55.0	62.65
Means	63.23	63.15	68.90	65.07	61.12	54.85	62.720 —.128
May 19.		3*h*.					
179 59	62.2	65.1	68.0	63.8	63.0	52.9	62.50
	62.6	65.0	66.9	64.0	61.1	54.0	62.26
	62.1	64.8	67.0	64.0	61.0	53.9	62.13
C.	62.8	64.6	67.1	64.1	61.1	54.5	62.37
	62.9	64.9	67.1	64.0	60.8	54.1	62.30
	62.5	64.7	66.9	63.9	61.1	54.0	62.18
Means	65.52	64.85	67.17	63.97	61.35	53.90	62.292 —.129

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
13, No. 1	65.0	70.0	68.3
		71.1	68.5
18, " 1	68.0	61.4	60.5
19, " 1	67.0	63.5	63.0
" 2	63.0	67.0	64.4
		67.8	64.5

23. Six observations with micrometer reduced to the meridian.
25, 26. Interrupted by clouds.
31. Faint and tremulous.
39, 40. Limbs poorly defined.
44. Faint.
Nadir Points, May 13 and May 19, No. 2. Apparent error of collimation 4″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	E.	Means.	Mic.	Barometer.	THERMOMETE At.	Ext.	St.	Up.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
May 27	1		5	— 9 32.7	307 23 73.9	65.8	76.6	68.0	67.9	63.0	69.20	. .	29.750	79.0	75.6	77.5	79.5
	2			— 4 3.7	71.0	62.6	73.9	65.0	64.8	60.7	66.33	. .					
	3	Polaris, S. P.	4	+ 0 9.3	70.0	62.4	73.0	63.1	64.1	59.5	65.35	. .			76.0		79.5
	4			3 59.3	70.1	62.9	73.9	64.8	64.6	59.9	66.03	. .					
	5		3	+ 9 46.3	73.6	67.3	78.1	69.1	68.8	63.4	70.05	. .	29.740	78.8	76.0		79.5
	6	ξ Ursæ Minoris	4	. . . .	320 38 32.4	24.9	36.9	28.6	23.9	21.6	28.05	. .	29.718	76.8	73.9		76.4
	7	β¹ Scorpii	4	. . . .	58 14 63.0	59.6	67.0	61.0	59.1	54.0	60.62	. .			73.6		76.5
	8	β² Scorpii, (Mic.)	4	. . . .	" " "	"	"	"	"	"	"	30.196					
	9	δ Ophiuchi	4	. . . .	42 10 33.0	29.6	36.5	32.0	25.7	22.6	29.90	. .	29.728	76.4	73.5	77.5	76.5
	†10	α Scorpii	4	. . . .	64 56 54.6	49.3	58.6	52.8	47.2	41.3	50.63	. .	29.726	76.5	73.5		76.3
	11	α Lyræ	4	. . . .	0 14 68.6	63.2	70.6	65.8	63.0	58.6	64.97	. .	29.708	75.0	70.0	77.5	75.6
	12	β Lyræ	4	. . . .	5 42 23.0	19.0	27.3	22.5	16.7	14.2	20.45*d*	. .			70.1		75.7
	13	ζ Aquilæ	4	. . . .	25 14 53.1	50.0	58.2	51.1	46.1	45.1	50.60	. .	29.710	74.8	70.2		74.7
	†14	η Lyræ	4	. . . .	0 0 41.2	36.9	45.9	41.1	33.3	31.0	38.23	. .	29.710	74.5	69.8		74.8
	15	α Aquilæ	4	. . . .	30 24 67.6	63.1	71.0	65.2	63.1	56.8	64.47	. .	29.698	74.0	69.9		73.5
	16	α¹ Capricorni, (Mic.)	3	. . . .	" " "	"	"	"	"	"	"	32.178					
	17	α² Capricorni	4	. . . .	51 53 22.4	20.0	25.9	22.0	16.9	12.0	19.87	. .	29.700	74.0	69.7	77.0	73.5
June 3	†18	Sun, S. L. (Mic.)	1	— 0 49.0	16 49 65.7	61.0	69.6	61.0	60.3	53.5	61.85	30.690	30.112	76.2	79.5	73.0	78.0
	†19	Sun, N. L.	4	. . . .	16 17 42.0	37.7	46.8	38.3	34.4	30.7	38.32*d*	. .					
	20	α Lyræ	4	. . . .	0 14 64.6	60.0	68.0	62.7	59.3	53.6	61.37	. .	30.022	71.0	66.5	71.0	72.5
4	21		1	0 47.0	16 41 73.4	69.2	75.4	68.0	67.4	59.2	68.77	30.032					80.2
	22	Sun, S. L. (Mic.)	2	0 33.0	" " "	"	"	"	"	"	"	.039					
	23		3	— 0 15.0	" " "	"	"	"	"	"	"	.034					
	†24		4†	+ 0 3.0	16 10 34.6	30.4	36.9	30.8	25.0	22.0	29.95	29.981	29.940	78.5	88.4	73.0	81.0
	25	Sun, N. L. (Mic.)	5†	0 18.0	" " "	"	"	"	"	"	"	.989					
	26		6†	0 35.0	" " "	"	"	"	"	"	"	30.000					
	†27		7†	+ 0 55.0	" " "	"	"	"	"	"	"	.001					
	28		5	— 9 45.5	307 23 73.7	68.0	77.7	70.0	68.4	62.1	69.98	. .	29.824	75.8	71.9	74.2	76.4
	29	(Mic.)		4 57.5								30.059					
	30	(Mic.)		4 27.5								.070					
	31	(Mic.)		3 57.5								.072					
	32	(Mic.)		3 27.5								.072					
	33	(Mic.)		2 52.5								.079					
	34			— 2 32.5	68.6	63.9	73.0	65.1	64.1	57.6	65.38	. .					
	35	Polaris, S. P.	4†	+ 0′52.5	68.6	64.1	73.1	65 1	65.1	57.4	65.57	. .			71.7		75.6
	36			4 25.5	68.7	64.3	73.6	65.9	65.2	57.0	65.78	. .					
	37	(Mic.)		7 7.5								29.981					
	38	(Mic.)		7 37.5								.979					
	39	(Mic.)		8 7.5								.968					
	40	(Mic.)		8 32.5								.959					
	41	(Mic.)		8 57.5								.944					
	42		3	+ 9 39.5	72.0	68.1	76.9	68.9	69.1	60.4	69.23	. .	29.826	75.5	71.6		75.2
	†43	α Bootis	4	. . . .	18 54 19.9	15.1	23.0	17.2	14.5	7.0	16.12	. .	29.818	75.2	71.2		73.5
6	44	Sun, S. L. (Mic.)	1	— 0 49.0	16 29 65.0	60.7	69.7	60.4	58.5	51.8	61.02	30.990	29.952	74.8	77.2	75.5	78.0
	45	Sun, N. L.	4	. . . .	15 57 27.2	22.8	32.1	23.6	19.9	15.2	23.47*d*	. .					
	46		5	9 39.3	307 24 67.7	62.4	73.6	64.3	63.0	56.7	64.62	30.863	30.010	74.0	67.5		
	47			7 39.3								.883					
	48			5 39.3								.910					
	49			3 39.3								.914					
	50			— 1 39.3								.930					
	51	Polaris, S. P., (Mic.)	4	+ 0 2.7								.925					
	52			2 2.7								.913					

DATE.	MICROMETER Coincid.	Val. 1 *r.*	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
May 27, 16*h.*	30.005	62.75			
June 3, 5*h.*	30.002		Sun . .	18	15 50.57
" 4, 5*h.*	29.997		Sun . .	21	15 48.25
" 6, 13*h.*	30.009		Sun . .	44	15 48.37

May 27. Error of Runs —0″34. Temp. of circle 75° ; of stone 77°
June 3. do. .21 do. 75° do. 75°
June 4. do. .24 do. 75° do. 75°
June 6. do. .22 do. 70° do. 75°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 4.76	—1 11.68	307 22 52.76	62.60	+ 88 29 11.60	+83.92	C.
0.89	.65	53.79				
0.04	.63	53.68				
0.86	.62	53.55				
4.98	1 11.61	53.46				
0.05	—0 45.12	320 37 42.88		+ 78 15 58.97	—46.54	
0.00	+1 28.73	58 16 29.35		— 19 22 47.50	37.83	
-0 11.88	1 28.72	58 16 17.46		— 19 22 35.61	38.08	
-0 0.03	0 49.88	42 11 19.81		— 3 17 37.96	36.54	
-0 0.18	1 57.23	64 58 48.04		— 26 5 6.19	—32.66	
-0 0.07	0 0.24	0 15 5.14		+ 38 38 36.71	+11.37	
-0 0.06	0 5.54	5 42 26.01		+ 33 11 15.84	14.06	
-0 0.01	0 26.14	25 15 16.73		+ 13 38 25.12	15.33	
-0 0.08	0 0.01	0 0 38.16		+ 38 53 3.69	23.06	
-0 0.01	0 32.54	30 25 37.02		+ 8 28 4.83	29.49	
-2 16.52	1 10.48	51 52 13.83		— 12 58 31.98	29.38	
0 0.12	1 10.58	51 54 30.33		— 13 0 48.48	29.51	
-0 42.80	0 14.27	16 33 42.75	63.16	+ 22 19 59.64		P.
-0 0.06	0 13.80					
-0 0.07	0 0.25	0 15 1.55	62.33	+ 38 38 40.03	9.48	
1.93	+0 13.80	16 26 32.42	62.67	+ 22 27 9.50		C.
1.53						
-0 2.24						
-0 1.03	+0 13.33					
0.70						
0.25						
-0 0.65						
-0 4.97	—1 12.38	307 22 52.63	62.67	+ 88 29 10.42	+85.05	
5.10	.40	52.45				
5.56	.40	52.02				
5.46	.40	52.12				
5.28	.40	52.30				
5.52	.40	52.06				
0.38	.41	52.59				
0.07	.41	53.09				
1.02	.42	52.34				
1.65	.42	51.71				
1.99	.43	51.45				
1.63	.43	51.72				
1.42	.43	51.93				
0.86	.43	52.50				
4.87	—1 12.43	51.93				
0.04	+0 19.02	13 54 35.10		+ 19 59 6.82	—71.42	
-1 1.20	13.95	16 13 25.40	63.32	+ 22 40 17.17		P.
-0 0.07	+0 13.48					
-0 58.42	—1 13.46	307 32 52.74	62.87	+ 88 29 11.18	+85.30	
57.88	.47	53.27				
58.21	.48	52.93				
57.50	.48	53.64				
57.96	.49	53.17				
57.52	.50	53.60				
56.93	.51	54.12				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
May 25.		18*h*.,	40*m*.				
179° 59′	65″5	60″4	68″8	62″8	60″0	55″8	62″22
	65.0	62.6	70.0	62.0	63.0	54.0	62.77
P.	65.4	60.7	68.4	61.8	59.2	55.5	61.83
	64.6	61.4	69.6	61.8	61.4	54.2	62.17
Means	65.12	61.28	69.20	62.10	60.90	54.87	62.246 —.129
May 27.		18*h*.					
179 59	66.9	61.9	69.5	63.9	59.9	56.0	63.02
	65.0	62.2	69.5	62.6	61.1	54.2	62.43
	65.3	62.9	69.6	62.9	61.9	54.5	62.85
C.	65.1	62.6	70.0	63.2	61.4	54.1	62.73
	64.9	62.9	69.9	63.2	61.0	54.1	62.67
	65.0	62.8	69.8	63.5	61.0	54.1	62.70
Means	65.37	62.55	69.72	63.22	61.05	54.50	62.733 —.131
June 3.		5*h*.					
179 59	68.0	61.0	72.0	62.0	60.5	56.7	63.37
	66.2	63.0	72.3	61.0	63.5	54.2	63.37
	67.0	62.6	71.5	61.7	61.6	56.0	63.40
P.	66.0	62.6	72.0	61.7	63.5	54.0	63.30
	67.0	62.4	71.8	62.0	61.8	55.8	63.47
	65.5	62.3	71.3	61.4	62.2	54.3	62.83
Means	66.62	62.32	71.82	61.63	62.18	55.17	63.289 —.132
June 3.		18*h*.					
179 59	65.0	61.0	69.0	63.6	58.0	55.0	61.93
	64.2	62.6	70.6	63.4	61.4	52.6	62.47
	65.0	62.6	70.6	64.0	60.0	54.0	62.70
P.	65.0	62.6	70.6	64.0	60.3	54.0	62.75
	65.0	62.6	70.4	64.0	60.3	54.0	62.75
	63.3	62.6	70.6	63.0	61.7	52.0	62.20
Means	64.58	62.33	70.30	63.67	60.28	53.60	62.461 —.131
June 4.		13*h*.,	30*m*.				
179 54	66.2	62.2	70.0	63.8	60.1	55.4	62.95
	66.1	62.3	70.9	63.1	61.0	54.8	63.03
	66.0	62.1	70.0	63.9	60.9	54.8	62.95
C.	66.2	62.4	70.1	63.6	61.1	54.7	63.02
	65.9	62.1	70.0	63.2	60.8	54.2	62.70
	65.9	62.2	70.1	63.1	60.5	54.6	62.73
Means	66.05	62.22	70.18	63.45	60.73	54.75	62.897 —.131
June 6.		5*h*.,	20*m*.				
179 59	67.5	61.3	71.7	63.0	58.6	56.8	63.15
	66.0	63.6	73.0	62.0	62.4	54.3	63.55
P.	67.0	63.0	72.2	63.0	60.8	55.5	63.58
	66.6	63.0	72.2	63.0	60.8	55.5	63.52
Means	66.77	62.72	72.28	62.75	60.65	55.52	63.450 —.130

THERMOMETERS.

R POINTS.	Stone.	Upper.	Lower.
	°	°	°
27, No. 1	77.5	75.0	74.9
		77.0	75.4
3, " 1	73.0	79.5	74.5
3, " 2	71.0	74.0	73.0
4, " 1	74.2	75.2	74.0
		76.4	74.6
6, " 1	75.5	78.0	76.0

10. Large; poorly defined.
14. Correction for divisions, —0″.13.
18, 19. Limbs poorly defined.
24 to 27. Too close to the fixed wire for satisfactory observations with the micrometer.
43. Interrupted by clouds.
Nadir Point, June 4. Apparent error of collimation, 8″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMET			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
June 16	1	(Mic.)		− 3 39.2								30.693					
	2	(Mic.)		− 1 39.2								.705					
	3	Polaris, S. P. . . (Mic.)	4	+ 0 5.8								.707					
	4	(Mic.)		2 5.8								.691					
	5	(Mic.)		4 5.8								.683					
	6	(Mic.)		6 5.8								.673					
	7	(Mic.)		8 5.8								.650					
	8	(Mic.)	3	9 46.8								.618	29.960	80.0	77.0		
	9		2	19 36.8	307 24 26.2	20.8	30.8	21.3	21.3	15.3	22.62	. .					
	10		1	+29 18.8	50.0	45.4	56.7	46.4	47.3	38.6	47.40	. .	29.960	80.0	76.0		
	11	δ Ophiuchi	4	. . .	42 10 29.7	26.5	35.0	27.6	24.2	17.4	26.73	. .	29.976	75.0	71.2		73.
	12	α Scorpii	7	. . .	64 56 51.7	48.0	58.0	50.6	47.0	38.6	48.98	. .		74.5	71.5		
17	†13	12 Canum Venat. (Mic.) .	4	. . .	359 44 39.6	38.1	46.5	40.8	35.0	29.0	38.17	30.038	30.062	76.4	74.3		76.
	14		5	− 8 41.5	307 23 69.1	67.9	75.9	66.1	68.0	57.9	67.48	. .	30.060	76.3	74.0	73.0	75.
	15	(Mic.)		3 57.5								30.058					
	16	(Mic.)		3 41.5								.058					
	17	(Mic.)		3 27.5								.057					
	18	(Mic.)		3 10.5								.058					
	19	(Mic.)		2 57.5								.059					
	20			− 2 38.5	65.4	64.0	72.3	64.0	64.1	55.3	64.18	. .					
	21	Polaris, S. P. .	4	+ 0 12.5	66.1	63.1	72.1	64.0	63.9	55.0	64.03	. .			73.5		75.
	22			3 30.5	66.9	64.0	72.8	64.6	64.7	55.4	64.73	. .					
	23	(Mic.)		6 12.5								29.981					
	24	(Mic.)		6 32.5								.979					
	25	(Mic.)		6 47.5								.969					
	26	(Mic.)		7 4.5								.971					
	27	(Mic.)		7 23.5								.971					
	28		3	+ 8 41.5	69.1	67.0	76.4	67.0	68.2	57.8	67.58	. .	30.062	76.0	73.2		74.
	†29		3	− 3 23.8	313 14 42.0	39.9	49.2	44.6	37.4	32.1	40.87	. .	30.062	70.3	66.0		69.
	30	Anonymous	4†	+ 0 29.2	43.0	40.1	50.1	45.0	38.1	32.2	41.42	. .					
	†31	α Lyræ	3	. . .	0 14 58.8	60.0	66.0	61.2	57.8	48.8	58.77	. .	30.066	70.3	67.0	73.0	70.
18	32	β Ursæ Minoris	4	. . .	324 6 70.1	64.5	76.2	67.0	67.2	58.5	67.25*d*	. .	30.000	75.0	72.5	73.0	74.
	33	β Libræ	4	. . .	47 41 28.2	23.4	31.0	27.8	21.3	14.8	24.42	. .					
19	†34	Sun, S. L.	3	− 0 16.0	15 42 49.7	49.6	56.0	49.0	44.6	37.7	47.77*d*	. .	29.886	77.5	85.0	73.0	80.
	†35	Sun, N. L.	6	+ 0 31.5	15 11 15.9	16.6	19.2	15.1	11.6	3.9	13.72	. .					80.
	†36	β Libræ	5	. . .	47 41 27.1	23.1	31.4	27.2	21.2	16.0	24.33	. .	29.812	69.8	77.0	74.5	74.
	†37	α Coronæ Borealis . . .	4	. . .	11 39 18.5	16.5	24.2	18.0	16.8	7.1	16.85	. .	29.810	76.2	70.0		74.
	38	α Serpentis	4	. . .	31 58 17.4	15.8	22.3	14.4	14.1	5.8	14.97	. .	29.810	76.0	69.8		74.
	†39	β Draconis	4	. . .	346 28 46.0	41.8	54.2	43.1	41.5	34.9	43.58	. .	29.808	75.0	69.6	75.0	75.
	40	γ Draconis	4	. . .	347 23 15.5	13.0	23.0	13.1	12.1	4.7	13.57	. .	29.802	74.3	69.5		74.
20	†41		1	− 0 46.5	15 10 30.3	30.3	35.4	31.0	24.5	19.1	28.43	29.904	29.790	78.5	86.1	74.8	82.
	42	Sun, N. L. (Mic.) . .	2	0 32.5	“ “ “	“	“	“	“	“	“	.892					
	43		3	− 0 12.5	“ “ “	“	“	“	“	“	“	.880					
	44		4†	+ 0 3.5	“ “ “	“	“	“	“	“	“	.890					
	45		5†	0 19.5	15 41 52.9	50.2	58.0	51.2	46.1	39.5	49.65	29.721					83.
	46	Sun, S. L. (Mic.) . .	6†	0 42.5	“ “ “	“	“	“	“	“	“	.698					
	†47		7†	+ 1 1.5	“ “ “	“	“	“	“	“	“	.671					
21	48		3	− 9 47.2	310 25 37.1	35.2	46.8	37.0	31.6	24.0	35.28	. .	30.020	68.2	66.0	72.2	64.
	49	(Mic.)		6 3.2								29.968					
	50	(Mic.)		5 48.2								.951					
	51	(Mic.)		5 29.2								.951					
	52	Polaris . . . (Mic.)		5 7.2								.951					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
June 17, 13*h*.	30.005	62.75			
“ 19, 6*h*.	30.007		Sun . .	34	15 47.12
“ 20, 6*h*.	30.002		Sun . .	41	15 47.19

June 17. Error of Runs —0″.37. Temp. of circle 72° ; of stone 73°
June 18. do. do. .21 do. do. 75° do. 75°
June 19. do. do. .24 do. do. 75° do. 75°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR trument.	ORRECTIONS FOR Objects.	Corrected Readings.	Zenith Point. 359° 59′	Apparent Declinations.	Reduction to 1850.0	Observers.
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
43.76	— 1 11.90	307 22 50.54				P.
43.98	11.91	50.31				
43.98	11.93	50.29	62.97	+ 88 29 8.48	+85.92	
43.20	11.95	51.05				
43.35	11.96	50.89				
43.78	11.97	50.45				
43.81	11.99	50.40				
43.36	12.01	50.83				
19.94	12.06	50.62				
0 44.51	— 1 12.11	50.78				
-0 0.02	+ 0 50.53	42 11 17.28		— 3 17 35.06	—38 41	
-0 0.23	+ 1 58.69	64 58 47.44		— 26 5 5.22	32.01	
2.04	— 0 0.25	359 44 35.88	62.38	+ 39 9 5.75	—79.12	C.
3.95	1 12.66	307 22 50.87				
4.04	.70	50.74				
3.93	.70	50.85				
3.80	.70	50.98				
3.76	.70	51.02				
3.76	.70	51.02				
0.39	.71	51.08				
0.03	.73	51.27		+ 83 29 9.47	+86.00	
0.66	.74	51.33				
0.59	.76	51.38				
0.69	.76	51.28				
0.24	.76	51.74				
0.56	.77	51.40				
0.80	.77	51.16				
—0 3.95	1 12.78	50.85				
+0 1.55	1 0.07	312 13 42.35		+ 85 39 59.80	0.69	
—0 0.03	— 1 0.07	41.32				
—0 0.04	+ 0 0.24	0 14 58.97		+ 38 38 42.66	+ 5.13	
+0 0.04	— 0 40.29	324 6 27.00	62.53	+ 74 47 14.78	—68.67	P.
0.08	+ 1 1.14	47 52 25.64		— 8 48 43.86	49.14	
0.03	0 13.00	15 27 13.67	62.66	+ 23 26 28.24		C.
0.28	0 12.55					
+0 0.19	1 0.27	47 42 24.79		— 8 48 42.88	49.19	
—0 0.04	0 11.48	11 39 28.29		+ 27 14 13.62	53.15	
0.06	+ 0 34.73	31 58 49.64		+ 6 54 52.27	46.71	
0.06	— 0 13.39	346 28 30.13		+ 52 25 11.78	19.42	
—0 0.08	— 0 12.46	347 23 1.03		+ 51 30 40.88	—10.29	
+0 6.11	+0 12.45					
6.79						
7.50						
6.95		15 26 34.91	62.50	+ 23 27 6.84		
17.87	+0 12.90					
19.77						
21.00						
5.06	— 1 6.29	310 24 34.05				
4.22	.23	33.27				
5.13	.22	34.19				
4.94	.21	34.01				
4.76	.20	33.84				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
June 17.		12*h*.,	30*m*.				
179° 59′	63″7	63″0	71″1	61″2	61″9	52″0	62″15
	64.4	64.1	71.6	61.5	62.8	52.9	62.88
	64.4	64.0	71.5	62.3	63.0	52.3	62.92
C.	63.5	63.1	71.0	61.1	62.0	52.1	62.13
	63.9	63.7	71.0	62.0	62.2	52.8	62.60
	64.5	62.8	71.0	62.1	61.0	53.0	62.40
Means	64.07	63.47	71.20	61.68	62.15	52.52	62.514 —.131
June 18.		14*h*.,	30*m*.				
179 59	65.5	62.2	71.5	63.6	61.4	54.7	63.15
	63.5	62.8	71.5	61.8	62.2	51.4	62.20
	65.5	62.2	71.5	63.8	60.6	54.3	62.98
P.	63.7	63.0	74.5	61.6	62.6	51.0	62.23
	65.0	61.3	70.8	62.8	60.0	53.4	62.22
	65.3	63.3	71.8	63.5	62.2	53.0	63.18
Means	64.75	62.47	71.43	62.85	61.50	52.97	62.661 —.131
June 19.		16*h*.					
179 59	65.6	61.9	71.0	64.1	60.2	54.2	62.83
	65.1	62.8	71.1	63.8	61.7	53.4	62.98
	64.4	62.1	70.9	63.0	60.8	53.0	62.37
C.	64.9	63.0	71.3	63.5	62.0	53.7	63.07
	64.0	62.9	71.1	63.1	61.1	52.9	62.52
	64.6	63.0	71.8	63.6	61.8	53.0	62.97
Means	64.77	62.62	71.20	63.52	61.27	53.37	62.789 —.131

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
17, No. 1	73.0	76.5	74.7
		76.6	74.6
18, " 1	73.0	75.0	73.5
19, " 1	75.0	76.0	74.6
		78.0	75.0

13. Three micrometer observations reduced to the meridian.
29. Apparent A. R. 18*h*., 20*m*., 28*s*.—very small and faint.
31. Obscured at fourth wire by clouds.
34, 35. Observations poor.
36. Wires illuminated by the star.
37, 39. Faint; through clouds.
41 to 47. Very unsteady; Zenith Point interpolated.
Nadir Points. June 17 and 19. Apparent error of collimation, 6″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMET			
							A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
			No.	M. S.	°	′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	
June 21	1	Polaris . . . (Mic.)		— 4 53.2										29.958					
	†2			4 19.2	310	25	40.5	39.4	50.5	41.0	35.5	28.8	39.28	. .			66.4		
	†3		4	— 0 4.2			40.4	38.9	50.0	41.5	35.1	30.2	39.35	. .			66.4		64.
	4			+ 3 22.8			40.9	39.0	50.2	41.6	34.0	29.0	39.12	. .			64.5		
	5	(Mic.)		5 50.8										30.031					
	6	(Mic.)		6 10.8										.039					
	7	(Mic.)		6 30.8										.039					
	8	(Mic.)		6 57.8										.032					
	9	(Mic.)		7 22.8										.037					
	10		5	+ 9 38.8			37.2	34.2	46.4	38.0	29.6	26.3	35.23	. .	30.020	67.2	66.7		64.
22	11	α Coronæ Borealis . . .	4	. . . .	11	39	15.0	15.1	21.1	18.0	11.1	3.9	14.03	. .	30.138	67.0	59.6	70.0	68.
	12	α Serpentis	4	. . . .	31	58	14.4	14.1	19.9	15.4	9.9	1.9	12.60	. .	30.130	66.5	59.5	70.0	68.
	13	ζ Ursæ Minoris	4	. . . .	320	38	23.4	22.9	33.5	25.1	19.9	12.1	22.82	. .			59.5		
	14	β^1 Scorpii	4	. . . .	58	14	55.0	56.2	63.3	58.4	52.6	45.0	55.08	. .	30.128	65.8	59.0		64
	†15	β^2 Scorpii, (Mic.) . . .	4	. . . .	“	“	“	“	“	“	“	“	“	30.225					
	†16	α Scorpii	4	. . . .	64	56	43.5	44.1	52.0	49.1	38.0	31.9	43.10	. .	30.126	64.8	58.2		63
	17	γ Draconis	4	. . . .	347	23	11.9	11.2	21.0	14.1	7.2	1.1	11.08	. .	30.116	62.5	55.6	69.8	60
	18	μ^1 Sagittarii	5	. . . .	59	57	26.6	28.6	36.8	31.9	22.5	15.9	27.05*d*	. .			55.5		60
	†19	Anonymous	3	— 3 22.5	313	14	40.8	39.7	49.9	44.0	35.1	29.1	39.83	. .	30.110	62.0	55.3		60
	20		4	. . . .			40.2	40.4	50.9	45.2	36.4	30.0	40.52	. .					
	21		5	+ 3 22.5			40.1	39.2	49.2	44.2	35.6	28.3	39.43	. .			55.0		6
	†22	α Lyræ	4	. . . .	0	14	54.6	58.0	64.3	59.6	54.8	42.9	55.70	. .	30.108	61.8	54.9		6
	23	β Lyræ	4	. . . .	5	42	11.5	14.1	21.0	16.2	9.6	0.3	12.12*d*	. .			54.9		5
	24	ζ Aquilæ	4	. . . .	25	14	42.6	46.9	56.4	47.8	36.1	29.2	43.17	. .	30.104	61.5	55.1		5
	†25	η Lyræ	4	. . . .	0	0	29.4	32.0	38.9	36.0	25.5	16.2	29.67	. .			55.1		5
23	†26	Sun, S. L., (Mic.) . .	1	— 0 50.0	15	42	29.7	29.4	37.7	31.1	23.4	16.8	28.02	29.893	30.126	66.7	72.5		
	†27	Sun, N. L.	4	. . . .	10	10	63.2	63.2	69.8	63.7	58.6	49.2	61.28	. .					
24	28	Polaris, S. P., (Mic.) .		— 2 20.9	307	24	61.0	56.2	68.0	56.6	56.6	47.0	57.57	30.877	30.136	71.0	71.5		7
	29		4	+ 0 7.1										.873					
	30			2 7.1										.858					
	31			4 7.1										.847					
	32			6 7.1										.843					
	33			8 7.1										.813					
	34		3	+9 49.1										.790					
	35	α Bootis	4	. . . .	18	53	73.7	72.0	80.0	72.4	70.4	59.5	71.33	. .	30.130	70.8	68.0	68.0	70
	36	α Lyræ	4	. . . .	0	14	56.5	55.4	64.0	57.0	53.5	43.0	54.90	. .	30.096	68.0	65.0		
27	37	Sun, N. L., (Mic.) . .	1	— 0 48.0	15	17	48.7	47.6	54.7	48.4	41.4	33.9	45.78*d*	30.389	30.020	72.5	88.5	72.8	75.
	38		2	31.0	“	“	“	“	“	“	“	“	“	.389					
	39		3	— 0 16.0	“	“	“	“	“	“	“	“	“	.379					
	40		4	0 0.0	“	“	“	“	“	“	“	“	“	.361					
	41	Sun, S. L., (Mic.) . .	5†	+ 0 21.0	15	48	72.6	72.1	78.0	71.1	68.5	58.0	70.05	30.202					76.
	42		6†	37.0	“	“	“	“	“	“	“	“	“	.196					
	43		7†	+ 0 53.0	“	“	“	“	“	“	“	“	“	.221					
July 1	44	Polaris, S. P., .	5	— 9 29.1	307	23	70.1	63.5	77.0	64.9	65.0	57.6	66.35	. .	29.816	78.0	80.5	74.0	80.
	45	(Mic.)		6 19.1										30.041					
	46	(Mic.)		5 59.1										.051					
	47	(Mic.)		5 42.1										.058					
	48	(Mic.)		5 22.1										.050					
	49	(Mic.)		5 2.1										.056					
	50			4 30.1			66.9	60.0	72.8	61.0	61.2	52.9	62.47	. .					
	51	(Mic.)		1 22.1										30.019					
	52	(Mic.)		1 2.1										.022					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
June 23, 7*h*.	30.008	62.76	Sun .	26	15 47.26
“ 24, 13*h*.	30.008				
“ 27, 7*h*.	30.006		Sun .	37	15 47.95
July 1, 13*h*.	30.001				

June 22. Error of Runs —0″68. Temp. of circle 65°; of stone 70°
June 23. }
June 24. } do. —0.20 do. 65° do. 65°
June 27. }
July 1. do. +0.01 do. 79° do. 74°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 4.20	—1 6.19	310 24 33.29				C.
1.06	.18	34.16				
0.10	.18	33.27	62.30	+ 88 29 7.80	+86.18	
0.70	.17	33.65				
0.34	.16	33.30				
0.05	.16	33.01				
0.27	.16	33.23				
1.02	.15	33.99				
1.02	.15	33.99				
-0 4.92	—1 6.14	34.01				
0 0.06	+0 11.85	11 39 25.82		+ 27 14 15.73	—53.74	
0.16	+0 35.83	31 58 48.27		+ 6 54 53.28	47.10	
0.14	—0 47.08	320 37 35.60		+ 78 16 5.95	53.99	
0.01	+1 32 60	58 16 27.67		— 19 22 46.12	37.91	
0 14.02	1 32.59	58 16 13.65		— 19 22 32.10	38.15	
0 0.29	+2 2.48	64 58 45.87		— 26 5 4.32	31.85	
0 0.28	—0 12.95	347 22 57.85		+ 51 30 43.70	11.28	
0 0.05	+1 39.67	59 59 6.67		— 21 5 25.12	6.95	
0 1.58	—1 1.45	313 13 39.96				
0 0.06	.47	38.99		+ 85 40 2.06	— 1.00	
-0 1.58	—1 1.49	39.52				
-0 0.08	+0 0.24	0 14 55.86		+ 38 38 45.69	+ 3.41	
-0 0.02	0 5.78	5 42 17.92		+ 33 11 23.63	6.53	
-0 0.05	0 27.29	25 15 10.41		+ 13 38 31.14	9.62	
—0 0.05	0 0.01	0 0 29.63		+ 38 53 11.92	15.21	
+0 7.37	0 13.49	15 27 1.62	62.34	+ 23 26 39.97		P.
+0 0.06	+0 13.02					
—0 54.86	—1 13.24	307 22 49.47				
54.34	.24	49.99				
53.64	.24	50.69				
53.64	.24	50.69	62.39	+ 88 29 8.51	+86.14	
54.47	.24	49.86				
54.08	.24	50.25				
54.26	—1 13.24	50.07				
0.01	+0 19.34	18 54 30.66		+ 19 59 10.98	—74.15	
0.07	+0 0.25	0 14 55.08		+ 38 38 46.56	+ 2.80	
23.56						C.
23.73						
23.17	+0 12.61					
22.00		15 33 23.23	61.87	+ 23 20 17.89		
11.98						
11.33	+0 13.06					
12.49						
4.67	—1 11.22	307 22 50.46				
4.50	.25	50.60				
4.92	.26	50.17				
5.18	.26	49.91				
4.49	.26	50.60				
4.69	.27	50.39				
1.06	.27	50.14				
1.19	.30	49.98				
1.33	.30	49.84				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
June 22.		15h.,	30m.				
179° 59′	64″3	63″0	70″9	64″4	58″8	52″5	62″32
	63.4	63.9	71.1	64.5	59.9	51.9	62.45
	63.8	63.4	71.1	65.0	59.8	52.0	62.52
C.	63.4	63.6	70.9	64.8	59.5	51.6	62.30
	63.9	64.1	71.6	65.1	59.9	52.1	62.78
	63.1	63.2	71.1	65.0	59.1	51.6	62.18
Means	63.65	63.53	71.12	64.80	59.50	51.98	62.425 —.131
June 24.		13h.,	30m.				
179 59	66.6	60.5	72.0	62.7	62.0	53.0	62.85
	64.7	62.2	72.7	61.7	62.7	50.4	62.40
P.	65.5	61.7	72.5	62.0	61.3	51.4	62.37
	64.6	63.2	72.7	62.0	63.0	49.3	62.47
Means	65.35	61.90	72.42	62.10	62.25	51.10	62.521 —.131
June 27.		12h.					
179 59	63.9	62.2	71.9	61.9	60.2	49.4	61.58
	64.9	62.9	71.9	63.0	60.6	51.2	62.42
	64.0	62.1	71.4	62.8	59.8	50.4	61.75
C.	64.3	62.5	71.6	62.9	60.0	50.9	62.03
	64.2	62.9	71.9	62.6	60.4	50.8	62.13
	64.0	63.0	72.2	62.0	60.9	50.4	62.08
Means	64.22	62.60	71.82	62.53	60.32	50.52	62.000 —.133

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
22, No. 1	70.0	68.9	68.0
		68.8	68.3
24, " 1	68.0	72.0	70.0
27, " 1	73.0	76.5	74.0
		77.0	74.0

15. β^2 Scorpi follows β^1 0*s*.40 (three wires.)
16. Large and very unsteady.
19. Apparent R. A. 18*h*., 20*m*., 23*s*.5.
22. Large, poorly defined.
25. Cor. for divisions—0″.13.
26, 27. Limbs poorly defined. Zenith point doubtful.
Nadir Points, June 22 and 27. Apparent error of collimation, 8″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMET			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	
July 1	1	Polaris, S. P. (Mic.)		− 0 42.1								30.023					
	2	(Mic.)		0 22.1								.021					
	3	(Mic.)		− 0 2.1								.028					
	4		4	+ 0 15.9	307 23 66.1	59.6	71.9	60.6	60.8	52.0	61.88	. .			80.0		80.
	5			3 7.9	66.8	60.1	72.1	61.1	61.9	53.0	62.50	. .					
	6	(Mic.)		6 47.9								29.972					
	7	(Mic.)		7 7.9								.970					
	8	(Mic.)		7 27.9								.968					
	9	(Mic.)		7 47.9								.963					
	10	(Mic.)		8 7.9								.960					
	11		3	+ 9 54.9	70.4	65.6	76.6	65.4	66.1	57.4	66.92	. .	29.828	78.0	79.6		80.
6	†12	Sun, S. L. (Mic.)	1	− 0 50.6	16 27 15.3	9.5	21.0	6.6	9.7	0.0	10.30d	30.049	29.894	81.4	87.4	75.5	85.
	13		2	0 32.6	" " "	"	"	"	"	"	"	.048					
	14		3	− 0 15.6	" " "	"	"	"	"	"	"	.041					
	15		4	+ 0 0.4	" " "	"	"	"	"	"	"	.038					
	16	Sun, N. L. Mic.)	5†	0 24.4	15 55 29.4	24.6	34.9	22.1	22.1	14.9	24.67	29.869			89.3		85.
	17		6†	0 39.4	" " "	"	"	"	"	"	"	.869					
	†18		7	+ 0 51.4	" " "	"	"	"	"	"	"	.873					
	19	Polaris, S. P.	5	− 9 32.2	307 23 71.3	63.2	78.3	61.2	64.9	58.9	66.30	. .	29.836	84.2	86.4	77.5	85.
	20	(Mic.)		6 36.2								30.042					
	21	(Mic.)		6 11.2								.051					
	22	(Mic.)		5 51.2								.058					
	23	(Mic.)		5 36.2								.053					
	24	(Mic.)		5 11.2								.060					
	25			4 34.2	68.0	60.0	73.4	59.0	60.9	55.7	62.83	. .					
	26	(Mic.)		1 11.2								30.024					
	27	(Mic.)		0 51.2								.027					
	28	(Mic.)		0 31.2								.029					
	29	(Mic.)		− 0 11.2								.021					
	30	(Mic.)		+ 0 8.8								.031					
	†31		4	0 16.8	65.9	58.0	72.0	57.2	58.6	53.5	60.87	. .			86.1		85.
	32			4 16.8	67.8	59.4	73.2	59.6	60.6	55.1	62.62	. .					
	33	(Mic.)		6 33.8								29.979					
	34	(Mic.)		6 53.8								.975					
	35	(Mic.)		7 13.8								.976					
	36	(Mic.)		7 33.8								.969					
	37	(Mic.)		7 53.8								.966					
	38		3	+ 9 53.8	70.4	63.8	77.1	62.9	65.4	58.8	66.40	. .	29.838	84.0	85.7		85.
	39	α Serpentis	4	. . .	31 58 20.1	13.6	24.0	13.0	13.3	5.2	14.87	. .	29.842	81.5	79.0	78.3	81.
	40	ζ Ursæ Minoris	4	. . .	320 38 21.9	14.2	28.2	15.3	15.1	8.4	17.25	. .	29.838	81.5	78.4		81.
	41	β¹ Scorpii	4	. . .	58 14 64.3	60.1	70.2	58.8	61.1	51.4	60.98	. .	29.884	81.5	77.5		81.
	†42	β² Scorpii$_2$ (Mic.)	4	. . .	" " "	"	"	"	"	"	"	30.200					
	43	α Scorpii	4	. . .	64 56 56.7	51.9	63.3	54.1	50.1	41.4	52.92	. .	29.848	81.0	76.4		80.
	44	ε Ursæ Minoris	4	. . .	316 37 32.0	24.6	39.3	27.4	25.0	18.5	27.80d	. .	29.854	80.0	75.6		80.
	45	Moon, N. L. .	3	+ 0 14 3	58 56 25.3	22.1	32.1	24.8	19.5	14.0	22.97	. .	29.850	79.3	75.2	78.5	79.
	46	(Mic.)	6	+ 0 33.2	" " "	"	"	"	"	"	"	29.980					
	47	β Draconis	4	. . .	346 28 42.3	36.9	51.6	37.6	36.1	29.2	38.95	. .	29.856	79.2	74.9		79.
	48	γ Draconis	5	. . .	347 22 70.7	66.0	78.9	66.0	66.1	58.0	67.62	. .	29.856	79.0	75.4		79.
	†49	μ¹ Sagittarii	4	. . .	59 57 37.0	33.0	44.5	35.3	29.0	24.7	33.92d	. .	29.856	78.8	75.4		79.
	50	51 (Hev.) Cephei, S. P. . .	3	− 5 10.4	306 10 23.5	16.6	29.5	20.1	16.1	10.5	19.38	. .	29.854	78.5	75.7		77.
	51		4	+ 0 13.6	20.9	14.2	27.1	17.2	14.1	8.0	16.92	. .					
	52			+ 3 21.6	21.4	16.2	28.9	18.9	16.2	8.2	18.30	. .					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r.*	Objects.	No.	Semi-diam.
	revs.	″			′ ″
July 6, 7*h.*	29.999	62.76	Sun . .	22	15 47.69

July 6. Error of Runs +0″.03. Temp. of circle 80°; of stone 78°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 1.37	— 1 11.30	307 22 49.80				C.
1.33	.31	49.93	62.30	+ 88 29 8.77	+86.09	
1.66	.31	49.50				
0.01	.31	50.56				
0.51	.33	50.66				
0.62	.35	50.53				
0.74	.35	50.41				
0.85	.35	50.30				
0.82	.36	50.32				
0.90	.36	50.24				
5.10	— 1 11.37	50.45				
2.39	+ 0 13.56					
2.64						
2.42						
-0 2.33		16 11 33.73	63.19	+ 22 42 8.71		
+0 8.21	+ 0 13.09					
8.39						
+0 8.24						
-0 4.68	— 1 10.45	307 22 51.17				
4.83	.47	51.00				
5.11	.47	50.72				
5.35	.47	50.48				
4.88	.47	50.95				
5.09	.48	50.73				
1.04	.48	51.31				
1.56	.49	50.78				
1.71	.49	50.63				
1.82	.50	50.51				
1.30	.50	51.03		+ 88 29 8.36	+85.88	
-0 1.92	.50	50.41				
+0 0.04	.50	50.41				
-0 0.91	.52	51.19				
0.98	.53	51.11				
0.88	.53	51.21				
1.26	.53	50.83				
1.08	.54	51.00				
1.15	.54	50.93				
-0 5.03	— 1 10.55	50.82				
0.00	+ 0 34.16	31 58 49.03		+ 6 54 53.41	—48.81	
+0 0.02	— 0 44.92	320 37 32.35		+ 78 16 10.09	57.08	
0.00	+ 1 28.42	58 16 29.40		— 19 22 46.96	38.09	
-0 12.46	1 28.41	58 16 16.93		— 19 22 34.49	38.33	
+0 0.02	+ 1 57.03	64 58 49.97		— 26 5 7.53	31.54	
0.06	— 0 52.02	316 36 35.84		+ 82 17 6.60	34.24	
0.15	33 12.18	58 23 11.26		— 19 29 28.42		
0.80						
0.00	0 13.27	346 28 25.68		+ 52 25 16.76	24.70	
+0 0.13	— 0 12.34	347 22 55.41		+ 51 30 47.03	15.73	
-0 0.04	+ 1 35.00	59 59 8.88		— 21 5 26.44	— 7.17	
2.50	— 1 15.19	306 9 1.69				
0.00	.22	1.72		+ 87 15 19.37	+ 2.22	
-0 1.05	— 1 15.24	2.01				

NADIR POINTS—READINGS.							
	A.	B.	C.	D.	E.	F.	Means.
July 1.		13*h*.,	30*m*.				
179° 59′	65″2	62″3	72″3	60″6	61″2	51″2	62″13
	65.2	63.0	72.9	61.2	62.1	51.1	62.58
	65.1	63.2	72.3	61.1	62.2	51.0	62.48
C.	65.2	62.4	72.7	61.1	61.4	50.9	62.28
	65.5	62.9	72.4	61.4	62.1	51.0	62.55
	65.6	62.8	72.8	61.5	62.1	50.7	62.58
Means	65.30	62.77	72.57	61.15	61.85	50.83	62.436 —.133
July 6.		13*h*.,	30*m*.				
179 59	66.0	62.5	74.0	60.3	64.9	53.0	63.45
	66.3	62.7	73.9	59.9	65.0	52.0	63.30
	66.9	61.9	74.1	61.0	64.0	53.0	63.48
C.	66.6	62.1	74.0	60.9	63.6	52.5	63.28
	66.9	62.1	73.8	61.0	64.0	52.4	63.37
	65.7	62.1	74.0	60.7	64.0	51.7	63.03
Means	66.40	62.23	73.97	60.63	64.25	52.43	63.320 —.133

THERMOMETERS.

R POINTS.	Stone.	Upper.	Lower.
	°	°	°
1, No. 1	74.0	80.0 79.4	78.0 77.0
6, " 1	77.5	85.2 84.8	81.2 80.9

12 to 18. External thermometer noted immediately before and after the observations; probably affected by solar rays.
31. Observation at fourth wire poor.
42. β^2 Scorpii follows β^1 0*s*.60, (three wires.)
49. Correction for divisions —0″.10.
Nadir Point, July 1 and 6. Apparent error of collimation, 4″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMET			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
July 6	1	α Lyræ	4	. . .	0 14 55.1	53.0	62.4	53.6	51.1	41.4	52.77	. .	29.850	78.2	75.3		77.
7	2	Sun, S. L., (Mic.)	1	− 0 49.0	16 32 31.7	26.6	39.5	27.2	23.0	16.8	27.47*d*	29.146	29.942	81.0	85.0	78.0	82.
	3	Sun, N. L.	4	. . .	16 1 52.2	47.5	60.5	48.0	44.8	37.3	48.38	. .					
	4	Polaris, S. P., (Mic.)	5	− 9 32.7	307 24 49.3	43.0	59.0	45.0	42.3	36.3	45.82	30.627	29.932	82.0	83.0		
	5			7 32.7								.655					
	6			5 32.7								.677					
	7			3 32.7								.683					
	8			− 1 32.7								.706					
	9		4	+ 0 9.3								.705					
	10			2 9.3								.690					
	11			4 9.3								.676					
	12			6 9.3								.651					
	13			8 9.3								.632					
	14		3	9 52.3								.615	29.932	82.0	82.0		81.
	†15	Moon, N. L.	7	+ 0 50.0	58 27 57.0	54.0	64.6	54.5	51.4	43.3	54.13	. .	29.954	74.5	70.1		73.
	16	α Lyræ	4	. . .	0 14 54.7	50.7	62.7	54.0	48.0	41.2	51.88	. .		74.7	70.0		
	17	β Lyræ	4	. . .	5 41 72.1	69.0	80.0	70.6	66.9	57.9	69.42*d*	. .					
8	18	Sun, N. L., (Mic.)	1	− 0 49.4	16 8 24.0	24.0	32.2	23.9	18.3	10.4	22.13	29.949	30.024	78.0	84.4	76.0	81.
	19		2	0 31.4	" " "	"	"	"	"	"	"	.941					
	20		3	− 0 15.4	" " "	"	"	"	"	"	"	.932					
	21		4	+ 0 3.6	" " "	"	"	"	"	"	"	.936					
	22	Sun, S. L., (Mic.)	6†	0 38.6	16 39 47.1	47.0	56.0	46.1	39.0	32.9	44.68	29.741			84.7		81.
	23		7†	+ 0 52.6	" " "	"	"	"	"	"	"	.748					
	24	12 Canum Venat.	5	. . .	359 44 38.9	34.4	47.4	37.5	29.0	25.8	35.50	. .	29.972	80.5	82.4		81.
	†25	Polaris, S. P.	5	− 9 29.4	307 23 71.4	66.3	80.4	65.8	64.8	57.6	67.72	. .	29.972	80.5	82.1	77.0	81.
	26	(Mic.)		6 33.4								30.048					
	27	(Mic.)		6 13.4								.058					
	28	(Mic.)		5 53.4								.054					
	29			− 3 7.4	67.2	62.1	75.8	60.9	59.9	54.0	63.32	. .					
	30		4	+ 0 13.6	67.0	61.3	75.3	61.0	58.0	53.6	62.70	. .			81.2		81.
	31			4 26.6	67.4	63.0	76.9	61.3	60.2	53.4	63.70	. .					
	32	(Mic.)		6 6.6								29.982					
	33	(Mic.)		6 26.6								.980					
	34	(Mic.)		6 46.6								.978					
	†35		3	+ 9 50.6	71.4	67.0	79.9	66.1	64.1	58.1	67.77	. .	29.970	80.5	80.4		81.
	36	α Virginis	4	. . .	49 14 14.4	11.9	20.9	11.0	7.9	2.1	11.37	. .	29.972	80.4	80.0	77.0	81.
	37	α Lyræ	4	. . .	0 14 54.2	51.6	61.5	53.4	47.9	40.8	51.57	. .	29.964	77.0	73.2		76.
	38	β Lyræ	4	. . .	5 41 72.0	70.3	81.2	70.9	68.0	58.1	70.08	. .	29.960	76.9	73.1	77.0	76.
	39	ζ Aquilæ	4	. . .	25 14 45.7	44.0	53.8	45.0	36.1	30.6	42.53	. .	29.962	77.0	72.7		76.
	†40	Moon, S. L., (Mic.)	1	− 0 51.5	57 5 36.0	35.0	44.1	37.0	28.0	24.0	34.02	29.238	29.958	76.5	73.4		76.
	41		2	0 34.3	" " "	"	"	"	"	"	"	.254					
	†42		3	− 0 19.0	" " "	"	"	"	"	"	"	.308					
	†43	Moon, N. L., (Mic.)	4	+ 0 4.0	56 32 48.4	48.0	57.9	49.6	42.4	35.9	47.03*d*	30.030					75.
	44	γ Aquilæ	4	. . .	28 38 26.8	25.1	35.1	27.2	20.8	13.1	24.68	. .	29.956	76.5	73.4		75.
	45	α Aquilæ	4	. . .	30 24 59.8	57.0	68.0	57.4	55.9	44.4	57.08	. .					
	46	β Aquilæ	4	. . .	32 51 17.4	17.1	25.4	17.6	13.6	4.0	15.85	. .	29.954	76.4	72.4		74.
9	†47	Sun, S. L., (Mic.)	1	− 0 49.0	16 47 27.9	25.7	36.9	24.8	20.5	12.4	24.70*d*	30.387	29.996	81.3	88.2	76.0	84.
	†48	Sun, N. L.	4	. . .	16 15 29.0	26.5	37.7	26.6	21.5	14.4	25.95	. .					
	49	Moon, N. L.	4	. . .	53 19 19.7	16.3	26.0	18.0	12.4	4.6	16.17	. .	30.030	77.0	73.4		
10	50	Sun, S. L., (Mic.)	1	− 0 48.9	16 54 20.9	15.9	25.8	15.2	13.5	3.1	15.73	29.860			92.1		90.
	51		2	0 31.9	" " "	"	"	"	"	"	"	.879					
	52		3	− 0 15.9	" " "	"	"	"	"	"	"	.834					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r.*	Objects.	No.	Semi-diam.
	revs.	″			′ ″
July 7, 8*h.*	30.001	62.76	Sun . .	2	15 46.98
13*h.*	30.004				
" 8, 8*h.*	30.005		Sun . .	18	15 47.62
			Moon .	40	16 38.55
" 9, 8*h.*	30.003		Sun . .	47	15 48.02

July 7. Error of Runs 0″.00. Temp. of circle 80°; of stone 80°
July 8. do. −0.03 do. do. 78° do. 77°
July 9. do. 0.00 do. do. 80° do. 80°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
trument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0.07	+ 0 0.24	0 14 52.94	63.19	+ 38 38 49.50	− 0.88	C.
54.40	0 13.76	16 17 48.65	63.41	+ 22 35 54.09		P.
0.01	+ 0 13.30					
43.70	− 1 11.15	307 22 50.97	62.99	+ 88 29 8.96	+85.78	
43.70	.17	50.95				
43.73	.18	50.91				
43.19	.19	51.44				
44.13	.21	50.48				
43.96	.22	50.64				
43.26	.23	51.33				
43.03	.24	51.55				
42.53	.26	52.03				
42.82	.27	51.73				
0 43.36	1 11.28	51.18				
0 1.90	—33 20.80	57 54 35.23	62.57	— 19 0 53.41		
0 0.08	+ 0 0.24	0 14 52.04		+ 38 38 49.78	— 1.19	
0 0.04	0 5.59	5 42 15.05		+ 33 11 26.77	+ 2.13	
4.12	0 13.47	16 24 27.59	63.06	+ 22 29 14.72		C.
4.33						
4.69						
4.36						
16.31	+ 0 13.94					
16.86						
0 0.08	— 0 0.25	359 44 35.33		+ 39 9 6.98	—80.34	
0 4.71	1 11.37	307 22 51.64		+ 88 29 8.98	+85.66	
4.87	.41	.44				
5.28	.41	.03				
4.82	.42	.48				
0.55	.45	.32				
0.04	.49	.17				
1.06	.53	.11				
0.54	.55	.61				
0.64	.56	.50				
0.74	.56	.40				
5.06	— 1 11.59	.12				
0.00	+ 1 3.57	49 15 14.94		— 10 21 32.63	—63.45	
—0 0.08	0 0.23	0 14 51.72		+ 38 38 50.59	— 1.47	
+0 0.14	0 5.55	5 42 15.77		+ 33 11 26.54	+ 1.83	
—0 0.02	+ 0 26.23	25 15 8.74		+ 13 38 33.57	6.13	
+0 42.36	—49 25.92	56 0 12.10		— 17 6 29.79		
43.45						
+0 41.85						
—0 1.04	—49 12.43					
0.07	+ 0 30.33	28 38 54.94		+ 10 14 47.37	18.42	
0.00	0 32.60	30 25 29.68		+ 8 28 12.63	20.89	
0.05	0 35.92	32 51 51.72		+ 6 1 50.59	+18.99	
23.20	0 13.91	16 31 27.39	63.88	+ 22 22 15.74		P.
—0 0.02	+ 0 13.45					
+0 0.01	—30 52.38	52 48 23.80	63.41	— 13 54 41.14		
9.61	+ 0 13.89					C.
8.09						
+0 10.72						

NADIR POINTS—READINGS.							
	A.	B.	C.	D.	E.	F.	Means.
July 7.		7*h*.,	30*m*.				
179° 59′	67″3	62″0	74″8	62″3	60″0	53″3	63″28
	65.4	63.5	75.3	60.7	63.0	50.7	63.10
	67.2	62.8	75.0	63.0	61.2	52.8	63.67
P.	66.3	64.0	75.8	63.0	63.4	52.0	64.08
	66.6	63.0	74.5	62.6	61.3	52.4	63.40
	65.6	64.0	75.7	62.3	63.5	51.2	63.72
Means	66.40	63.22	75.18	62.32	62.07	52.07	63.542 —.133
July 7.		17*h*.,	30*m*.				
179 59	65.4	62.2	73.0	64.4	59.0	52.4	62.72
	63.8	63.5	73.3	63.0	61.5	49.7	62.47
	64.5	62.4	73.3	64.3	60.0	52.0	62.75
P.	63.7	63.0	73.5	63.4	62.3	49.7	62.60
	65.3	62.4	73.3	64.4	59.5	52.8	62.95
	64.3	63.5	73.6	63.3	61.6	50.0	62.72
Means	64.50	62.83	73.33	63.80	60.65	51.10	62.702 —.133
July 8.		13*h*.,	30*m*.				
179 59	66.4	63.0	73.7	62.3	60.2	51.2	62.80
	67.1	63.2	74.2	63.9	60.0	52.1	63.42
	66.7	63.4	74.0	63.9	61.0	51.7	63.45
C.	66.2	63.0	73.9	64.1	60.4	51.9	63.25
	66.1	62.6	74.2	64.0	60.9	50.8	63.10
	66.6	63.0	74.0	63.9	60.9	50.5	63.15
Means	66.52	63.03	74.00	63.68	60.57	51.37	63.195 —.133
July 9.		7*h*.,	30*m*.				
179 59	68.2	63.3	76.4	63.3	60.4	54.2	64.30
	66.7	64.5	76.7	61.6	63.2	51.2	63.98
	68.3	63.4	76.3	63.3	60.3	54.2	64.30
P.	65.0	64.0	76.6	61.3	62.6	54.4	63.98
	67.2	63.2	75.8	62.4	60.5	52.3	63.57
	66.5	64.2	77.0	62.0	63.4	50.7	63.97
Means	66.98	63.77	76.47	62.32	61.73	52.83	64.017 —.135
July 9.		15*h*.,	30*m*.				
179 59	68.4	62.0	74.7	62.0	60.0	54.0	63.52
	67.0	63.2	75.4	61.0	62.6	50.6	63.30
	68.3	62.5	74.7	62.8	60.4	53.4	63.68
P.	67.0	63.3	75.4	62.3	62.3	51.4	63.62
	68.2	62.0	75.0	63.3	60.3	53.6	63.73
	66.2	63.2	76.0	62.0	62.6	50.4	63.40
Means	67.52	62.70	75.20	62.23	61.37	52.23	63.541 —.133

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
7, No. 1	78.0	82.5	80.0
" 2		74.5	75.5
8, " 1	77.0	81.2	78.7
		80.8	78.5
9, " 1	76.0	84.0	80.5
" 2	77.0	82.0	79.5

15. Time of observation not noted; Hour Angle obtained from intervals of wires.
25 to 35. Interrupted by light clouds.
42, 43. Nearly obscured by clouds.
40 to 42. Cor. of S. L. for defective illumination, +4″.34.
47, 48. Limbs poorly defined.
Nadir Point, July 8. Apparent error of collimation, 3″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMET			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
July 10	1	Sun, N. L. (Mic.)	4†	+ 0 11.1	16 22 64.0	59.7	58.9	58.3	55.4	47.0	57.22*d*	30.120	30.012	84.8	92.5	78.0	90.
	2		5†	0 24.1	"	"	"	"	"	"	"	.126					
	3		6†	0 39.1	"	"	"	"	"	"	"	.162					
	4		7†	+ 0 55.1	"	"	"	"	"	"	"	.149					
	5	12 Canum Venat. . . .	4	. . .	359 44 40.0	34.0	47.0	36.8	32.5	25.5	35.97	. .	30.056	88.5	91.2	80.0	90.
	6	Polaris, S. P. .	5	− 9 33.2	307 23 72.0	65.1	79.1	64.2	66.0	57.0	67.23	. .	30.052	88.5	90.6	80.0	89.
	7	(Mic.)		6 55.2								30.052					
	8	(Mic.)		6 35.2								.058					
	9	(Mic.)		6 15.2								.067					
	10	(Mic.)		5 55.2								.061					
	11	(Mic.)		5 35.2								.059					
	12			4 25.2	68.0	59.8	74.6	59.9	60.6	52.6	62.58	. .					
	13	(Mic.)		1 40.2								30.024					
	14	(Mic.)		1 20.2								.029					
	15	(Mic.)		1 0.2								.021					
	16	(Mic.)		0 40.2								.022					
	17	(Mic.)		− 0 20.2								.024					
	18		4	+ 0 13.8	67.9	59.1	73.1	59.3	59.2	52.6	61.87	. .			90.3		89.
	19			4 50.8	68.1	60.5	74.4	60.2	60.9	52.9	62.83	. .					
	20	(Mic.)		6 4.8								29.986					
	21	(Mic.)		6 24.8								.978					
	22	(Mic.)		6 44.8								.979					
	23	(Mic.)		7 4.8								.971					
	24	(Mic.)		7 24.8								.963					
	25		3	+ 9 49.8	71.9	64.7	78.9	63.3	65.6	56.3	66.78	. .	30.052	88.5	90.0		89.
	26	α Virginis	4	. . .	49 14 18.0	10.9	21.0	14.9	9.1	4.1	13.00	. .	30.054	88.5	89.5		89.
	27	α Coronæ Borealis . . .	4	. . .	11 39 16.6	11.8	23.9	12.9	11.8	2.9	13.32	. .	30.056	86.5	83.7	80.5	86.
	28	α Serpentis	4	. . .	31 58 19.8	15.0	25.0	14.0	13.0	5.4	15.37	. .	30.060	86.0	82.9		86.
	29	ζ Ursæ Minoris . (Mic.)		− 0 27.7	320 37 34.5	27.1	43.8	27.4	25.1	19.0	29.48*d*	29.254			82.5		86.
	30		4	. . .	38 21.1	15.1	30.3	13.6	15.1	6.6	16.97	. .					
11	†31	α Lyræ	4	. . .	0 14 55.7	49.0	63.5	50.4	48.3	40.3	51.20	. .	30.014	85.5	81.8		
12	32	Venus, N. L.	4	. . .	18 21 47.0	44.5	57.1	46.1	37.8	30.6	43.85	. .	30.042	79.2	79.1	83.2	81.
	†33	Venus, S. L. (Mic.) . .	4	. . .	"	"	"	"	"	"	"	29.728					
13	34	Sun, S. L. (Mic.) . . .	1	− 0 47.4	17 19 26.6	24.4	37.8	26.1	19.3	12.5	24.45	30.469	30.042	82.5	84.3		85.
	35		2	0 32.4	"	"	"	"	"	"	"	.449					
	36		3	− 0 15.4	"	"	"	"	"	"	"	.470					
	37		4	+ 0 1.6	"	"	"	"	"	"	"	.458					
	38	Sun, N. L. (Mic.) . . .	5	0 19.6	16 47 25.0	22.5	35.3	22.8	16.5	8.8	21.82*d*	30.020			85.1		86.
	39		6	0 35.6	"	"	"	"	"	"	"	.032					
	40		7	+ 0 53.6	"	"	"	"	"	"	"	.042					
	41	Polaris, S. P. .	5	− 9 27.1	307 23 70.8	66.1	81.1	66.2	64.2	56.0	67.40	. .	29.978	84.8	84.6	83.0	86.
	42	(Mic.)		6 38.1								30.041					
	43	(Mic.)		6 18.1								.036					
	44	(Mic.)		5 58.1								.042					
	45	(Mic.)		5 38.1								.054					
	46	(Mic.)		5 18.1								.057					
	47			3 58.1	67.5	62.1	77.6	62.1	60.0	52.0	63.55	. .					
	48	(Mic.)		1 33.1								30.021					
	49	(Mic.)		1 13.1								.024					
	50	(Mic.)		0 53.1								.028					
	51	(Mic.)		0 33.1								.024					
	52	(Mic.)		− 0 13.1								.028					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 r.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
July 10, 8*h*.	30.002	62.76	Sun .	1	15 48.48
" 12,			Venus .	32	0 8.68
" 13, 8*h*.	30.003		Sun .	34	15 48.12

July 10. Error of Runs +0″.54. Temp. of circle 86°; of stone 80°
July 11. do. do. .00 do. do. 80° do. 80°
July 13. do. do. .15 do. do. 84° do. 83°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR — trument.	ORRECTIONS FOR — Objects.	Corrected Readings.	Zenith Point. 359° 59′	Apparent Declinations.	Reduction to 1850.0	Observers.
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 7.36	+0 13.43	16 38 50.60	62.73	+ 22 14 51.38		C.
7.68						
9.80						
0 8.76						
0 0.04	—0 0.24	359 44 35.77		+ 39 9 6.21	—80.37	
0 4.64	1 10.37	307 22 52.22		+ 88 29 9.45	+85.44	
5.45	.38	51.40				
5.59	.38	51.26				
5.94	.39	50.90				
5.35	.39	51.49				
5.02	.39	51.82				
0.90	.39	51.29				
1.38	.40	50.80				
1.64	.40	50.54				
1.09	.41	51.08				
1.14	.41	51.03				
-0 1.25	.41	50.92				
+0 0.11	.41	51.57				
-0 1.11	.43	51.29				
0.85	.44	51.54				
0.56	.44	51.83				
0.85	.44	51.54				
0.59	.44	51.80				
0.34	.44	52.05				
-0 4.91	—1 10.45	51.42				
+0 0.09	+1 2.58	49 15 15.67		— 10 21 33.69	—63.58	
0.06	0 11.27	11 39 24.65		+ 27 14 17.33	56.84	
0.15	+0 34.15	31 58 49.67		+ 6 54 52.31	49.25	
47.22	—0 44.90	320 37 31.80		+ 78 16 9.97	57.81	
+0 0.16	—0 44.90	32.23				
-0 0.08	+0 0.24	0 14 51.36	62.52	+ 38 38 50.41	— 2.24	P.
+0 0.03	0 16.01	18 22 8.57	62.61	+ 20 31 33.29		C.
+0 17.31	0 16.09					
-0 28.35	0 14.52	17 3 22.58		+ 21 50 19.28		
27.43						
28.97						
28.35						
1.00	+0 14.07					
1.65						
2.07						
4.59	—1 11.03	307 22 51.78		+ 88 29 9.51	+85.20	
4.54	.05	51.81				
4.00	.05	52.35				
4.27	.06	52.07				
4.71	.06	51.63				
4.71	.06	51.63				
0.77	.07	51.71				
1.17	.08	51.30				
1.30	.08	51.17				
1.52	.08	50.95				
1.24	.09	51.22				
-0 1.48	.09	50.98				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
July	10.	13*h*.,	30*m*.				
179° 59′	68″2	61″4	74″9	60″8	61″8	51″8	63″15
	67.9	61.2	74.8	61.0	60.8	51.9	62.93
	67.9	61.8	74.9	61.0	61.0	52.0	63.10
C.	67.9	61.0	74.4	61.0	60.1	52.0	62.73
	67.9	61.5	74.1	61.1	60.2	52.0	62.80
	67.1	61.0	74.0	60.9	60.1	51.9	62.50
Means	67.82	61.32	74.52	60.97	60.67	51.93	62.870 —.138
July	11.	19*h*.					
179 59	69.5	60.5	75.0	61.6	58.8	53.3	63.12
	66.7	60.8	75.0	58.6	61.0	50.2	62.05
P.	68.0	60.0	75.0	60.4	59.0	53.6	62.67
	68.2	60.0	75.0	61.0	59.0	53.6	62.80
Means	68.10	60.32	75.00	60.40	59.45	52.68	62.659 —.135
July	13.	13*h*.,	30*m*.				
175 59	66.0	61.8	76.0	61.9	59.2	50.0	62.48
	67.0	62.2	76.6	62.9	58.7	50.9	63.05
	66.6	62.2	76.1	62.6	59.1	51.0	62.93
C.	66.2	62.1	75.9	62.2	59.0	50.7	62.68
	66.2	61.9	75.6	62.5	58.6	50.8	62.60
	66.1	62.1	76.0	62.2	58.9	51.0	62.72
Means	66.35	62.05	76.03	62.38	58.92	50.73	62.744 —.135

THERMOMETERS.

R POINTS.	Stone.	Upper.	Lower.
	°	°	°
10, No. 1	80.2	88.8	84.4
		88.2	84.0
1, " 1			85.5
3, " 1	83.0	85.8	84.0
		85.8	84.0

31 to 33. Very unsteady.
33. Cor. of S. Limb for defective illumination, +0″.07.
Nadir Point, July 10. Apparent error of collimation, 4″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMET			
					A.	B.	C.	D.	E.	E.	Means.	Mic.		At.	Ext.	St.	Up.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
July 13	1	Polaris, S. P.	4	+ 0 18.9	307 23 65.9	60.3	75.5	61.1	57.6	51.6	62.00	. .			84.2		86.
	2			4 18.9	66.1	62.0	76.8	62.8	59.5	53.0	63.37	. .					
	3	(Mic.)		6 1.9								29.988					
	4	(Mic.)		6 21.9								.987					
	5	(Mic.)		6 41.9								.984					
	6	(Mic.)		7 1.9								.980					
	7	(Mic.)		7 21.9								.979					
	8		3	+10 5.9	71.0	66.1	81.8	66.8	64.8	56.8	67.88	. .	29.974	84.9	83.9		85.
	9	α Bootis	4	. . . .	18 53 75.9	70.0	83.6	71.1	68.2	59.7	71.42	. .	29.972	84.5	82.5		85.
	10	β¹ Scorpii	4	. . . .	58 14 62.9	59.5	71.8	60.9	56.1	49.1	60.05	. .	29.982	82.0	76.7	83.0	82.
	†11	β² Scorpii, (Mic.)	4	. . . .	"	"	"	"	"	"	"	30.212					
14	†12	Sun, N. L., (Mic.)	3†	− 0 11.5	16 56 17.1	14.3	26.9	15.0	9.4	1.1	13.97	29.990	29.980	81.9	81.4	81.0	84.
	13		4†	+ 0 3.5	"	"	"	"	"	"	"	.992					
	14	Sun, S. L., (Mic.)	5†	0 20.5	17 27 48.0	45.3	56.9	46.5	37.8	31.9	44.40d	29.922			82.4		84.
	15		6†	+ 0 35.5	"	"	"	"	"	"	"	.930					
	16	Polaris, S. P.	5	− 9 21.2	307 23 71.7	65.7	80.9	67.0	62.7	57.1	67.52	. .	29.998	81.0	79.3		81.
	17	(Mic.)		6 49.2								30.036					
	18	(Mic.)		6 29.2								.038					
	19	(Mic.)		6 9.2								.042					
	20	(Mic.)		5 49.2								.042					
	21	(Mic.)		5 29.2								.051					
	22			4 9.2	69.6	63.1	78.6	64.1	60.1	54.6	65.02	. .					
	23	(Mic.)		1 39.2								30.030					
	24	(Mic.)		1 19.2								.032					
	25	(Mic.)		0 59.2								.029					
	26	(Mic.)		0 39.2								.032					
	27	(Mic.)		− 0 19.2								.030					
	28		4	+ 0 20.8	68.1	62.1	77.1	63.5	58.9	53.7	63.90	. .			79.0		81.
	29			4 50.8	69.9	63.9	78.6	65.1	60.8	55.0	65.55	. .					
	30	(Mic.)		6 10.8								29.990					
	31	(Mic.)		6 30.8								.991					
	32	(Mic.)		6 50.8								.992					
	33	(Mic.)		7 10.8								.991					
	34	(Mic.)		7 30.8								.989					
	35		3	+ 9 58.8	72.9	67.4	82.7	68.9	64.5	57.1	68.92	. .	30.000	81.0	78.7		81.
	36	α Virginis	4	. . . .	49 14 13.9	10.1	20.9	10.8	6.1	0.1	10.32	. .	30.004	80.8	78.4	81.0	80.
	37	α Bootis	4	. . . .	18 53 75.0	69.2	81.1	70.9	65.0	57.8	69.83	. .	30.014	80.5	76.6		81
	38	δ Ophiuchi	4	. . . .	42 10 26.8	25.9	37.1	27.9	19.1	10.9	24.62	. .	30.030	76.8	70.0	80.2	74.
	†39	α Scorpii	4	. . . .	14 56 52.8	50.1	64.0	54.8	43.2	36.2	50.18	. .	30.036	75.8	70.7		74
	40	ε Ursæ Minoris	4	. . . .	316 37 29.2	24.1	40.6	29.2	20.5	14.5	26.35d	. .	30.044	75.0	69.1		73
15	†41	Sun, S. L., (Mic.)	3	. . . .	17 21 23.5	22.3	35.0	25.3	15.4	7.4	21.48	15.000	30.208	70.0	71.0	75.0	73
	†42	Sun, N. L., (Mic.)	5	. . . .	"	"	"	"	"	"	"	45.136					
	†43	Mercury	4	. . . .	22 2 23.6	23.5	34.6	25.7	16.9	8.8	22.18d	. .	30.210	72.0	72.0		
	44	α Scorpii	4	. . . .	64 56 48.3	47.0	59.8	52.4	39.3	30.7	46.25	. .	30.230	70.0	62.0	74.0	68
	†45	Venus, N. L.	4	. . . .	17 50 59.1	61.9	70.0	64.0	51.9	44.0	58.48	. .	30.308	67.8	68.0	71.3	69
	†46	Venus, S. L., (Mic.)	4	. . . .	"	"	"	"	"	"	"	29.740					
16	47	Sun, S. L., (Mic.)	1	− 0 48.2	17 46 53.7	55.0	63.9	57.1	46.0	36.9	52.10	30.131	30.312	70.0	71.5	71.0	71
	48		2	0 31.2	"	"	"	"	"	"	"	.136					
	49		3	− 0 16.2	"	"	"	"	"	"	"	.124					
	50	Sun, N. L., (Mic.)	4†	+ 0 7.8	17 15 23.6	25.0	24.1	28.0	16.2	8.2	20.85	30.181			72.8		72.
	51		5†	0 20.8	"	"	"	"	"	"	"	.202					
	†52		6†	+ 0 38.8	"	"	"	"	"	"	"	.214					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 r.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
July 14, 8h.	30.005	62.76	Sun	12	15 47.52
" 15,			Sun	41	15 47.75
			Venus	45	0 8.42
" 16, 8h.	30.007		Sun	47	15 48.34

July 14. Error of Runs +0″.03. Temp. of circle 79° ; of stone 81°
July 15 } do. .00 do. 80° do. 80°
July 16 }

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
+0 0.03	—1 11.09	307 22 50.94				C.
-0 0.92	.10	51.35				
0.93	.10	51.34				
1.08	.10	51.19				
1.12	.10	51.15				
1.10	.11	51.16				
1.29	.11	50.97				
-0 5.24	—1 11.11	51.53				
+0 0.02	+0 18.70	18 54 30.14	62.61	+ 19 59 11.72	—76.01	
0.00	1 28.96	58 16 29.01		— 19 22 47.15	38.22	
-0 12.95	1 28.94	58 16 16.04		— 19 22 34.18	—38.46	
-0 0.99	0 14.23	17 12 16.60	62.89	+ 21 41 25.54		
0.78						
5.22	+0 14.71					
-0 4.80						
-0 4.51	—1 11.79	307 22 51.22				
4.26	.80	51.46				
4.17	.80	51.55				
4.19	.80	51.53				
3.99	.80	51.73				
4.34	.81	51.37				
0.86	.81	52.35				
1.64	.82	51.56				
1.72	.82	51.48				
1.49	.83	51.70				
1.65	.83	51.54		+ 88 29 9.74	+85.13	
0 1.51	.83	51.68				
0 0.02	.83	52.09				
0 1.17	.85	52.51				
[illegible].03	.86	52.66				
1.31	.86	52.38				
1.60	.86	52.09				
1.78	.86	51.91				
1.91	.86	51.78				
-0 5.14	—1 11.87	51.91				
-0 0.02	+1 3.81	49 15 14.15		— 10 21 32.01	—63.84	
0.02	0 18.94	18 54 28.79		+ 19 59 13.35	76.09	
0.01	0 50.72	42 11 15.35		— 3 17 33.21	40.82	
0.11	+1 59.10	64 58 49.39		— 26 5 7.25	31.44	
0.06	—0 53.02	316 36 33.39		+ 82 17 8.75	36.25	
-15 43.59	+0 15.36	17 21 32.68	62.68	+ 21 32 9.25		P.
-15 51.37	0 14.82					
-0 0.06	0 19.77	22 2 42.01		+ 16 50 59.92		
0.19	2 1.97	64 58 48.41	62.56	— 26 5 6.60	—31.42	
0.00	0 16.12	17 51 23.03	62.68	+ 21 2 18.90		C.
-0 16.78	0 16.19					
-0 6.87	0 15.54	17 31 12.17		+ 21 22 29.76		
7.53						
7.00						
10.80	0 15.04					
12.12						
12.79						

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
July 14.		13h.,	30m.				
179° 59′	65″4	64″2	76″0	63″0	59″1	49″8	62″92
	65.8	64.2	76.3	63.3	58.9	50.3	63.13
	66.1	64.4	76.1	63.7	59.4	50.8	63.32
C.	66.1	63.0	74.9	63.5	56.6	51.8	62.65
	66.5	64.8	75.5	63.9	58.2	50.9	63.30
	66.2	63.8	75.0	63.9	57.0	50.9	62.80
Means	66.02	64.07	75.63	63.45	58.20	50.75	63.020 —.133
July 15.		8h.					
179 59	64.7	64.3	75.8	66.3	56.6	49.5	62.87
	63.2	65.3	76.6	64.6	59.4	47.6	62.78
	65.0	64.3	75.3	67.0	56.6	50.4	63.10
P.	63.0	65.3	76.0	64.6	59.4	47.0	62.55
	64.5	64.3	75.2	66.2	56.4	49.0	62.60
	63.5	65.6	76.2	65.5	59.7	47.3	62.97
Means	63.98	64.85	75.85	65.70	58.02	48.47	62.811 —.130
July 15.		16h.					
179 50	66.0	63.2	75.4	65.8	56.6	48.8	62.63
	64.7	64.4	76.0	64.8	58.0	47.2	62.52
P.	65.7	63.2	75.4	66.4	56.3	49.4	62.73
	65.7	63.4	75.3	66.4	56.8	49.6	62.87
Means	65.52	63.60	75.47	65.85	56.92	48.75	62.687 —.130

THERMOMETERS.

POINTS.	Stone.	Upper.	Lower.
	°	°	°
4, No. 1	81.0	80.5	80.5
		81.8	80.5
5, " 1	75.0	74.5	73.5
" 2	74.0	73.5	72.0

11. β^2 Scorpii follows β^1 $0^s.50$ (three wires.)
12. External thermometer sensibly affected by N. wind.
39. Very unsteady.
41, 42. For coincidence of micrometer, used mean of July 14 and 16.
41. Observed on micrometer wire No. 2: reduction to No. 3, —0*r*.032:
42. " " " No. 4: " " +0*r*.027.
43. Too faint for observation of limbs.
45 to 52. Zenith Point doubtful.
46. Cor of S. L. for defective illumination, +0″.06.
52. Nearly obscured by clouds.
Nadir Point, July 14. Apparent error of collimation, 5″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.									Barometer.	THERMO		
						A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.
			No.	M. s.	° ′	″	″	″	″	″	″	″	Revs.	In.	°	°	°
July 16	1	Sun, N. L., (Mic.)	7	+ 0 52.8		"	"	"	"	"	"	"	30.202				
19	†2	Venus, S. L.	4	. . .	17 17	37.5	40.1	49.0	42.0	30.5	22.7	36.97*d*	. .	30.042	70.5	74.6	68.
	3	Venus, N. L., (Mic.)	4	. . .		"	"	"	"	"	"	"	30.261				
	†4	κ Orionis	4	. . .	48 36	24.4	26.1	33.1	29.3	17.9	10.0	23.47	. .	30.048	71.0	73.8	
20	5	Sun, N. L., (Mic.)	1	− 0 49.3	17 57	33.7	33.3	42.5	35.0	25.1	18.5	31.35*d*	30.132	30.038	74.0	78.2	68.
	6		2	0 32.3		"	"	"	"	"	"	"	.120				
	†7		3	− 0 16.3		"	"	"	"	"	"	"	.117				
	8	Sun, S. L., (Mic.)	4†	+ 0 8.2	18 28	72.8	72.4	81.1	73.0	67.9	56.9	70.68	30.162			79.5	
	9		5†	0 19.7		"	"	"	"	"	"	"	.168				
	†10		6	0 32.7		"	"	"	"	"	"	"	.179				
	11		7	+ 0 50.7		"	"	"	"	"	"	"	.179				
21	†12	Sun, S. L.	3½	. . .	18 40	26.6	27.0	33.9	29.4	19.1	10.0	24.33	. .	30.066	73.5	80.8	70.
	†13	Sun, N. L.	4½	. . .	18 8	52.7	54.3	60.1	54.6	43.5	37.1	50.38	. .				
23	†14	α Ophiuchi	4	. . .	26 12	28.1	30.0	38.0	30.4	22.0	12.5	26.83*d*	. .	29.870	76.0	75.3	73.
24	†15	Sun, N. L., (Mic.)	1	− 0 47.8	18 44	66.6	65.0	64.9	64.0	62.9	51.0	62.40	24.839	29.850	82.0	86.7	74.
	16		2	0 31.8		"	"	"	"	"	"	"	.841				
	17		3	0 15.8		"	"	"	"	"	"	"	.851				
	18		4	− 0 0.8		"	"	"	"	"	"	"	.869				
	19	Sun, S. L., (Mic.)	5†	+ 0 21.2	19 16	56.8	54.8	66.8	55.0	52.0	40.1	54.25	30.056			88.6	
	†20		6	0 34.2		"	"	"	"	"	"	"	.091				
	†21		7	+ 0 50.2		"	"	"	"	"	"	"	.104				
	22	12 Canum Venat.	4	. . .	359 44	37.8	33.8	46.4	34.8	29.9	24.7	34.57	. .			88.0	
	†23	Polaris, S. P.	5	− 9 30.7	307 23	70.0	64.1	79.4	62.7	64.8	56.1	66.18	. .	29.812	85.5	88.1	76.
	24	(Mic.)		7 7.7									30.037				
	25	(Mic.)		6 47.7									.047				
	26	(Mic.)		6 27.7									.049				
	27	(Mic.)		6 7.7									.049				
	28	(Mic.)		5 47.7									.049				
	29			4 27.7		67.1	62.0	76.8	59.7	61.0	53.1	63.28	. .			87.9	
	30	(Mic.)		1 37.7									30.035				
	31	(Mic.)		1 17.7									.041				
	32	(Mic.)		0 57.7									.038				
	33	(Mic.)		0 37.7									.030				
	34	(Mic.)		− 0 17.7									.038				
	35			+ 4 42.3		66.1	60.2	75.1	58.8	60.1	52.1	62.07	. .	29.810	85.2	88.1	
	36	(Mic.)		7 12.3									29.974				
	37	(Mic.)		7 32.3									.970				
	38	(Mic.)		7 52.3									.970				
	39	(Mic.)		8 12.3									.961				
	40	(Mic.)		8 32.3									.959				
	†41		3	+ 9 53.3		71.1	65.6	80.6	63.8	65.1	56.4	67.10	. .	29.808	85.5	87.8	
	42	α Bootis	4	. . .	18 53	73.9	68.9	80.1	67.1	66.9	57.9	69.13	. .	29.808	85.2	86.1	76.
	43	α Aquilæ	4	. . .	30 24	55.4	52.2	64.2	52.2	48.8	39.0	51.97	. .	29.894	80.5	75.5	77.
	44	β Aquilæ	4	. . .	35 50	75.1	73.4	83.3	73.5	69.8	59.9	72.50	. .	29.894	79.8	75.5	
	45	α¹ Capricorni	4	. . .	51 50	59.7	58.2	68.6	59.8	53.1	44.9	57.38	. .	29.898	79.0	74.1	
	46	α² Capricorni, (Mic.)	4	. . .		"	"	"	"	"	"	"	27.818				
	47	α Cygni	4	. . .	354 9	36.9	32.4	47.0	34.2	28.1	22.8	33.57	. .	29.904	79.0	73.7	
	48	61¹ Cygni	4	. . .	0 53	40.0	39.0	52.0	40.2	33.9	25.3	38.40	. .	29.908	78.0	73.0	77.
	†49	61² Cygni	4	. . .		"	"	"	"	"	"	"	29.961				
	50	α Cephei	4	. . .	336 57	49.9	48.0	62.5	47.4	44.5	34.5	47.81*d*	. .	29.906	78.0	73.6	
	51	α Andromedæ	4	. . .	10 38	57.7	56.1	69.1	57.1	52.1	41.3	55.57	. .	29.930	75.5	70.2	
	52	γ Pegasi	4	. . .	24 33	26.9	25.1	37.1	26.4	19.0	8.5	23.83	. .			70.4	

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
July 19,		62.76	Venus	2	0 7.87
" 20, 8*h*.	30.008		Sun	5	15 48.14
" 21,			Sun	12	15 47.28
" 24, 8*h*.	30.005		Sun	15	15 49.16

July 20. Error of Runs —0″13. Temp. of circle 74°; of stone 69°
July 21. }
July 23. } do. —0.05 do. 75° do. 75°
July 23. do. +0.23 do. 80° do. 76°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 12.52		17 17 44.43	62.32	+ 21 35 57.14		C.
-0 0.06	+0 15.27					
-0 15.64	0 15.24					
0.00	1 3.10	48 37 26.57		— 9 43 45.00	+ 8.18	
6.88	0 15.31	18 13 28.19		+ 20 40 13.38		
6.42						
6.54						
9.56	0 15.79					
9.95						
10.60						
-0 10.44						
-0 0.08	0 15.92	18 24 53.05	62.20	+ 20 28 48.40		
-0 0.04	0 15.43					
-0 0.06	0 27.16	26 12 54.05	61.79	+ 12 40 46.99	—24.38	
+0 11.16	0 15.61	19 1 17.20	61.85	+ 19 52 23.90		
10.68						
9.87						
+0 8.52						
-0 3.32	+0 16.09					
5.47						
-0 6.15						
+0 0.04	—0 0.24	359 44 34.37		+ 39 9 6.73	—80.16	
-0 4.61	1 10.16	307 22 51.41		+ 88 29 10.33	+83.74	
4.50	.18	51.50				
4.88	.18	51.12				
4.78	.18	51.22				
4.57	.18	51.43				
4.36	.18	51.64				
0.94	.19	52.15				
1.88	.18	51.22				
2.21	.18	50.89				
1.98	.18	51.12				
1.45	.17	51.66				
1.94	.17	51.17				
1.06	.16	50.85				
0.67	.18	51.22				
0.68	.18	51.21				
0.94	.18	50.95				
0.66	.18	51.23				
0.82	.18	51.07				
-0 4.98	—1 10.19	51.93				
+0 0.08	+0 18.48	18 54 27.69		+ 19 59 13.41	—76.67	
0.00	0 32.39	30 25 24.36	62.20	+ 8 28 17.09	+17.87	
0.00	0 35.63	32 51 48.13		+ 6 1 53.32	16.21	
0.01	1 10 33	51 52 7.72		— 12 58 26.27	23.40	
2 17.24	+1 10.42	51 54 25.04		— 13 0 43.59	23.53	
0 0.01	—0 5.66	354 9 27.92		+ 44 44 13.53	33.80	
0.03	+0 0.87	0 53 39.30		+ 38 0 2.17	51.09	
2.79	+0 0.87	0 53 42.06		+ 37 59 59.39	50.29	
+0 0.06	—0 23.57	336 57 24.30		+ 61 56 17.15	47.07	
0.00	+0 10.50	10 39 6.47	61.86	+ 28 14 34.64	68.64	
0.00	+0 25.50	24 33 49.33		+ 14 19 51.78	+65.04	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
July 20.		8h.					
179° 59′	63″6	65″9	74″0	63″7	59″1	48″1	62″40
	64.1	64.9	73.1	64.2	58.1	49.0	62.23
	64.5	65.3	73.7	65.0	58.8	49.3	62.77
C.	64.0	65.1	73.0	64.8	58.0	48.9	62.30
	64.1	65.7	73.1	64.9	58.3	48.9	62.47
	64.1	65.8	73.0	64.9	58.1	48.9	62.47
Means	64.07	65.45	73.32	64.58	58.40	48.85	62.445 —.128
July 23.		17h.,	30m.				
179 59	63.2	62.9	72.9	64.9	56.6	49.0	61.58
	63.1	64.4	74.0	64.1	59.9	47.9	62.23
C.	64.1	63.0	72.6	64.8	56.1	49.8	61.73
	65.0	63.2	73.0	65.2	56.3	50.1	62.13
Means	63.85	63.38	73.12	64.75	57.22	49.20	61.920 —.131
July 24.		13h.,	30m.				
179 59	65.1	63.0	74.5	59.5	61.1	49.6	62.13
	65.2	61.8	73.4	59.9	58.9	50.2	61.57
	66.0	62.0	73.6	60.0	59.5	50.6	61.95
C.	66.0	63.0	74.0	60.2	59.9	50.8	62.32
	65.1	63.1	74.4	60.0	60.6	49.6	62.13
	65.1	62.8	73.2	59.9	58.9	50.7	61.77
Means	65.42	62.62	73.85	59.92	59.82	50.25	61.978 —.133
July 24.		20h.,	30m.				
179 29	63.9	64.0	75.1	63.0	60.1	48.2	62.38
	64.1	63.0	74.1	63.0	58.5	49.0	61.95
C.	64.5	63.9	75.0	63.9	59.8	49.5	62.77
	64.6	63.2	74.1	63.1	59.2	49.1	62.22
Means	64.28	63.52	74.58	63.25	59.40	48.95	62.329 —.131
July 24.		20h.,	40m.				
179 59	64.0	64.1	75.7	62.9	60.5	48.0	62.53
	64.5	63.0	74.4	63.5	58.7	48.7	62.13
C.	64.0	63.6	75.0	62.9	60.0	48.1	62.27
	64.0	63.3	74.9	63.2	60.0	48.7	62.35
Means	64.22	63.50	75.00	63.12	59.80	48.38	62.321 —.131

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
20, No. 1	69.0	76.5	73.0
		76.4	72.4
23, " 1	73.5	75.6	75.2
24, " 1	76.0	86.4	81.9
		85.7	81.0
" 2	77.3	77.5	77.2
" 3	77.3	78.2	77.5

2. Cor. of S. L. for defective illumination, +0″.03.
2 to 4. Very unsteady.
7 to 10, 15, 20, 21, 23 to 41. Partially obscured by clouds.
12, 13. Barely visible through clouds; Zenith Point doubtful.
14. Microscopes damp; readings very difficult.
49. 61^{2} Cygni follows 61^{1} 1^{s}.28, (four wires.)
Nadir Points, July 20, 23, 24. Apparent error of collimation, 6″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMET At.	Ext.	St.	U
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	
July 24	1	α Cassiopeiæ	4	. . . .	343 12 28.3	26.6	40.1	27.2	22.3	13.5	26.33*d*	. .	29.940	75.5	69.9		75.
	2	Polaris	3	— 9 55.0	310 25 32.9	31.9	45.1	32.2	25.7	17.9	30.95	. .	29.946	75.4	69.5	77.2	75.
	3	(Mic.)		6 28.0								29.952					
	4	(Mic.)		6 8.0								.959					
	5	(Mic.)		5 48.0								.956					
	6	(Mic.)		5 28.0								.948					
	7	(Mic.)		5 8.0								.949					
	8			3 33.0	37.6	36.3	49.5	38.0	29.8	22.6	35.63	. .					
	9		4	— 0 18.0	38.6	37.0	50.1	38.9	29.9	24.2	36.45	. .			69.9		75.
	10			+ 3 17.0	37.9	35.8	49.1	37.0	28.2	22.9	35.15	. .					
	11	(Mic.)		5 42.0								30.020					
	12	(Mic.)		6 2.0								.027					
	13	(Mic.)		6 22.0								.030					
	14	(Mic.)		6 42.0								.032					
	15	(Mic.)		7 2.0								.032					
	16		5	+ 9 24.0	33.9	32.0	45.0	33.8	24.4	19.8	31.48	. .	29.952	75.1	71.0		7
25	17	Sun, S. L. (Mic.)	1	— 0 47.2	19 29 63.6	60.2	72.8	60.0	56.8	45.3	59.78	30.345	30.070	80.0	83.5	77.0	8
	18		2	— 0 30.2	"	"	"	"	"	"	"	.350					
	19		4	+ 0 0.8	"	"	"	"	"	"	"	.343					
	20	Sun, N. L. (Mic.)	6	+ 0 31.8	18 57 51.9	47.9	61.4	49.5	43.0	33.5	47.88*d*	29.833					
26	21	α Lyræ	4	. . . .	0 14 49.2	45.7	59.0	48.0	40.0	33.2	45.85	. .	30.120	78.2	74.0		7
	22	β Lyræ	4	. . . .	5 41 68.4	63.7	77.8	66.2	58.8	50.2	64.18	. .		78.2	75.5		7
	23	δ Aquilæ	4	. . . .	36 3 63.5	59.7	72.3	60.5	54.6	44.0	59.10	. .	30.114	77.8	73.7		
	24	γ Aquilæ	4	. . . .	23 38 24.2	20.4	34.0	22.8	16.3	5.3	20.50	. .		77.2	73.2		
	25	β Aquilæ	4	. . . .	32 50 75.0	72.4	83.0	73.3	66.5	57.0	71.20	. .	30.116	77.0	73.5		
	26	α² Capricorni	4	. . . .	51 53 18.2	15.2	26.0	17.2	9.0	0.4	14.33	. .	30.113	77.0	73.0		
	27	α Cygni	4	. . . .	354 9 36.4	32.7	47.5	34.7	27.3	19.7	33.05	. .	30.110	76.8	73.0	79.0	76
	28	61¹ Cygni	4	. . . .	0 53 42.3	40.6	53.3	42.0	33.3	26.0	39.58	. .	30.102	76.5	72.2		
	29	α Cephei	4	. . . .	336 57 52.2	46.2	63.0	48.6	42.2	35.2	47.90	. .					
	30	β Aquarii	4	. . . .	45 6 70.5	67.7	79.7	70.7	61.7	51.8	67.02	. .	30.100	76.0	72.2		
	31	ε Pegasi	4	. . . .	29 42 33.7	31.5	43.9	34.5	23.6	16.5	30.62*d*	. .			72.0		
	32	α Aquarii	4	. . . .	39 56 31.5	29.0	40.6	33.8	20.6	15.0	28.42	. .	30.100	75.7	71.5		76.
29	33	ε Ursæ Minoris	2	— 3 50.8	216 37 23.1	18.9	35.6	22.2	16.4	6.1	20.38	. .	29.958	78.5	71.5	78.7	77.
	34		4	— 0 2.8	27.1	22.3	39.7	27.0	19.1	10.1	24.22	. .					
	35		6	+ 3 46.2	23.2	19.1	35.6	23.1	16.0	7.4	20.73	. .			71.3		76.
	36	β Draconis	4	. . . .	346 28 36.0	32.9	48.6	35.0	25.9	20.4	33.13	. .	29.960	77.3	71.2		75.
	37	61¹ Cygni	4	. . . .	0 53 38.1	39.1	51.4	41.1	30.2	23.6	37.25	. .	29.940	74.3	70.8	78.2	74.
	38	61² Cygni	4	. . . .	"	"	"	"	"	"	"	29.950					
	39	ζ Cygni	5	. . . .	9 17 22.8	24.0	35.0	26.1	16.1	5.6	21.60*d*	. .					73.
	40	β Aquarii	4	. . . .	45 6 69.5	69.5	80.5	70.5	62.5	51.8	67.38*d*	. .	29.938	74.5	70.6		73.
	41	ε Pegasi	4	. . . .	29 42 32.6	33.1	45.1	35.1	25.2	16.0	31.19*d*	. .	29.938	74.2	70.0		74.
	†42	α Aquarii	4	. . . .	39 56 29.7	30.2	40.7	34.2	21.8	14.8	28.57	. .	29.928	74.0	69.8		74.
	43	Saturn, N. L.	4	. . . .	52 9 22.1	23.3	34.2	25.7	15.8	6.9	21.33	. .	29.928	73.8	69.7	78.0	74.
	44	Saturn, S. L. (Mic.)	4	. . . .	"	"	"	"	"	"	"	29.694					
	†45	α Ursæ Majoris, S. P.	4	. . . .	281 32 56.1	56.0	67.5	58.9	46.6	40.1	54.20*d*	. .	29.924	73.5	69.5		75.
	46	γ Cephei	4	. . . .	322 7 62.6	60.1	74.6	62.9	54.9	46.1	60.20	. .	29.918	73.0	68.9		74.
	47	α Andromedæ	4	. . . .	10 38 56.7	58.4	70.0	59.1	52.1	40.0	56.05	. .	29.920	73.0	68.9		73.
	48	γ Pegasi	4	. . . .	24 33 26.1	25.9	37.2	28.1	17.5	7.1	23.65	. .	29.920		68.8		73.
30	49	Sun, S. L. (Mic.)	2	— 0 31.8	20 39 63.3	59.0	73.0	60.3	55.7	44.0	59.22	30.617	29.932	81.0	84.7		
	50	Sun, N. L.	5	+ 0 19.8	20 6 46.7	43.3	58.0	46.0	37.5	29.2	43.45	. .					
	51	Venus, S. L.	4	. . . .	16 31 60.5	56.3	71.0	56.4	50.4	41.3	55.97	. .	29.970	81.5	85.0	79.0	84.
	52	Venus, N. L. (Mic.)	4	. . . .	"	"	"	"	"	"	"	30.235					

DATE.	MICROMETER. Coincid.	Val. 1 *r*.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
July 25, 9*h*.	30.007	62.76	Sun	17	15 50.40
" 29, 22*h*.	30.011		Saturn	43	0 9.95
" 30, 9*h*.	30.002		Sun	49	15 47.90
7*h*.	30.006		Venus	51	0 7.13

July 25. July 26.	Error of Runs	—0″.05.	Temp. of circle	75°;	of stone	75°
July 29.	do.	do.	.09	do.	do. 75°	do. 78°
July 30.	do.	do.	.05	do.	do. 75°	do. 75°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.06	—0 16.87	343 12 9.52	61.86	+ 55 41 31.59	+77.97	C.
5.10	1 5.57	310 24 30.48				
5.47	.56	.86				
4.82	.56	.21				
4.79	.55	.19				
5.10	.55	.50				
4.85	.55	.25				
0.66	.54	.71				
0.02	.53	.94		+ 88 29 10.49	+83.68	
0.53	.50	.18				
0.94	.46	.63				
0.58	.46	.27				
1.23	.45	.93				
0.71	.44	.42				
0.94	.43	.66				
-0 4.59	—1 5.40	.67				
0 20.28	+0 16.58	19 14 5.18	62.87	+ 19 39 36.94		P.
20.95						
0 21.08						
-0 10.81	0 16.09					
-0 0.07	0 0.23	0 14 45.61	62.04	+ 38 38 55.68	— 6.41	
-0 0.03	0 5.55	5 42 9.76		+ 33 11 31.53	— 3.05	
-0 0.01	0 40.62	36 4 39.71		+ 2 49 1.58	+ 9.64	
0.00	0 30.50	28 38 51.00		+ 10 14 50.29	14.95	
0.00	0 36.04	32 51 47.24		+ 6 1 54.05	15.89	
0.00	+1 11.08	51 54 25.41		— 13 0 44.12	23.41	
0.01	—0 5.72	354 9 27.32		— 44 44 13.97	33.14	
—0 0.01	+0 0.87	0 53 40.44		+ 38 0 0.85	50.44	
+0 0.01	—0 23.79	336 57 24.12		+ 61 56 17.17	46.34	
0.08	+0 56.11	45 8 3.21		— 6 14 21.92	39.98	
0.06	0 31.92	29 43 2.60		+ 9 10 38.69	44.52	
0.05	+0 46.87	39 57 15.34		— 1 3 34.05	+46.94	
3.89	—0 52.62	316 36 31.65				C.
0.05	.63	.64	62.45	+ 82 17 9.39	—39.39	
+0 3.75	0 52.64	.85				
0.00	—0 13.42	346 28 19.71		+ 52 25 21.99	—30.68	
—0 0.01	+0 0.87	0 53 38.11		+ 38 0 3.59	+49.47	
+0 3.80	0 0.87	0 53 41.92		+ 37 59 59.78	48.68	
0.10	0 9.13	9 17 30.83		+ 29 36 10.87	39.01	
0.04	0 55.99	45 8 3.41		— 6 14 21.71	39.65	
0.06	0 31.88	29 43 3.13		+ 9 10 38.57	43.93	
+0 0.06	0 46.77	39 57 15.40		— 1 3 33.70	+46.50	
—0 0.02	1 11.04	52 10 42.30		+ 13 17 0.60		
+0 19.88	+1 11.05					
+0 0.07	—4 26.12	281 28 28.15		+ 62 34 46.45	—73.23	
—0 0.05	—0 43.49	322 7 16.66		+ 76 46 25.04	+77.15	
0.03	+0 10.52	10 39 6.54		+ 28 14 35.16	67.44	
0 0.00	0 25.58	24 33 49.23		+ 14 19 52.47	+63.97	
1 40.83	0 17.52	20 22 48.01	62.55	+ 18 30 53.79		P.
0 0.36	0 17.02					
0.08	0 14.27	16 32 3.03	63.78	+ 22 21 40.00		
—0 14.33	+0 14.27					

NADIR POINTS—READINGS.

	A.	B.	C.	D	E.	F.	Means.
July 24.		23h.,	40m.				
179° 59′	63″0	64″2	75″4	63″1	60″0	47″9	62″27
	63.1	63.9	75.0	63.1	59.4	47.6	62.02
	62.9	64.8	75.1	62.9	59.2	47.3	62.03
C.	63.0	64.0	74.8	63.1	59.1	47.2	61.87
	63.4	64.8	75.0	63.2	59.8	47.6	62.30
	62.6	63.2	74.2	62.8	59.1	47.0	61.48
Means	63.00	64.15	74.92	63.03	59.43	47.43	61.995 —.131
July 25.		8h.,	30m.				
179 59	67.5	63.0	76.3	63.0	58.0	50.5	63.05
	66.7	64.7	77.0	63.0	60.8	50.0	63.70
	67.5	63.6	76.3	63.0	58.5	51.0	63.32
P.	65.5	64.0	76.3	62.3	59.7	49.0	62.80
	66.3	63.4	75.6	63.0	58.5	50.3	62.85
	65.5	63.0	75.6	61.8	59.7	48.3	62.32
Means	66.50	63.62	76.18	62.68	59.20	49.85	63.006 —.135
July 26.		18h.					
179 59	66.5	62.3	76.3	63.0	56.6	50.0	62.45
	64.7	63.0	77.0	61.7	58.3	47.4	62.02
P.	66.2	62.7	75.8	63.2	56.4	49.7	62.33
	64.7	63.3	76.4	61.6	58.3	47.0	61.88
Means	65.52	62.83	76.37	62.38	57.40	48.52	62.171 —.133
July 29.		22h.,	30m.				
179 59	64.0	64.4	75.6	66.4	56.5	48.2	62.52
	64.4	65.0	75.9	66.5	56.9	48.9	62.93
	63.4	65.0	75.3	66.0	56.9	48.0	62.43
C.	63.7	64.8	75.6	65.9	56.8	48.1	62.48
	64.0	65.1	75.8	66.1	57.0	48.0	62.67
	63.9	65.0	75.2	66.1	56.6	48.0	62.47
Means	63.90	64.88	75.57	66.17	56.78	48.20	62.583 —.132
July 30.		9h.					
179 59	66.8	62.0	76.0	63.0	55.5	48.8	62.02
	66.8	64.0	77.4	63.0	59.0	48.5	63.10
P.	67.3	63.0	76.3	63.6	57.4	50.0	62.93
	66.0	64.0	77.2	62.3	59.0	47.5	62.67
Means	66.72	63.25	76.73	62.98	57.72	48.70	62.683 —.135
July 30.		7h.					
179 59	70.2	63.0	78.5	63.3	58.7	50.8	64.08
	63.7	63.8	78.5	62.3	61.2	49.0	63.92
	69.4	63.5	77.3	63.3	59.0	50.0	63.75
P.	68.6	64.8	78.8	63.3	61.6	50.0	64.52
	67.8	73.8	77.8	62.7	60.2	49.2	63.58
	67.2	64.2	78.6	61.7	61.6	48.7	63.67
Means	68.65	63.85	78.25	62.77	60.38	49.62	63.920 —.137

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
24, No. 4	77.2	74.5	74.7
		76.0	75.8
25, " 1	77.0	83.0	79.5
26, " 1	79.0	79.0	78.5
29, " 1	78.0	74.8	75.2
		75.8	75.4
30, " 1		83.0	80.5
" 2	79.0	87.5	82.5

42. Run well along the wire.
45. Very steady.
Nadir Point, July 25. Mercury very unsteady.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMET At.	Ext.	St.	Up
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
August 3	†1	Moon, S. L., (Mic.)	1†	− 0 45.4	59 16 58.6	59.2	70.0	59.9	51.1	42.9	56.95	29.442	30.256	75.0	68.7		73.
	2		2	0 31.0	"	"	"	"	"	"	"	.459					
	†3		3†	− 0 11.9	"	"	"	"	"	"	"	.475					
	4	Moon, N. L., (Mic.)	4†	+ 0 8.2	58 44 35.0	35.8	47.1	38.0	26.2	20.7	33.80	29.922					
	5		5†	0 25.5	"	"	"	"	"	"	"	.941					
	6		6†	0 39.9	"	"	"	"	"	"	"	.929					
	7		7	+ 0 50.4	"	"	"	"	"	"	"	.936					
	8	δ Ursæ Minoris	3	− 4 22.8	312 18 42.0	40.1	55.1	43.1	32.8	25.3	39.73	. .	30.260	74.0	67.5		71
	9		4	− 0 4.8	43.3	42.2	56.5	44.4	34.1	26.3	41.13	. .					
	10		5†	+ 4 41.2	40.6	39.0	53.5	41.6	31.1	23.9	38.28	. .	30.258	73.5	68.2		7
	†11	α Lyræ	4	. . . .	0 14 45.1	45.0	57.1	47.9	36.0	29.2	43.38	. .			68.4		7
	12	β Lyræ	4	. . . .	5 41 63.1	63.5	75.4	65.0	56.1	46.8	61.65	. .	30.258	73.0	68.4		7
	†13	ζ Aquilæ	4	. . . .	25 14 38.0	38.5	48.3	39.8	27.0	20.1	35.28	. .	30.258	72.8	67.9		7
	†14	η Lyræ	4	. . . .	0 0 19.0	18.2	29.3	22.1	11.2	2.0	16.97	. .			67.7		7
	15	λ Ursæ Minoris	3†	− 9 59.7	310 3 35.5	36.1	48.9	37.0	27.1	18.1	33.78	. .	30.262	71.5	65.0	75.9	6
	16			5 3.7	37.8	38.5	51.0	39.2	29.0	20.8	36.05	. .					
	17		4	− 0 20.7	39.6	40.9	53.5	41.1	31.1	23.0	38.20	. .			65.0		6
	18			+ 4 24.3	38.9	40.1	52.1	40.8	30.9	22.0	37.47	. .					
	19			+ 8 42.3	37.1	38.1	50.2	38.6	28.5	20.6	35.52	. .	30.256	70.8	63.5		6
	20	61^1 Cygni	4	. . . .	0 53 36.6	39.8	50.0	41.9	29.1	21.1	36.42	. .	30.256	69.5	63.4		6
	21	61^2 Cygni, (Mic.)	4	. . . .	"	"	"	"	"	"	"	29.950					
	†22	ζ Cygni	4	. . . .	9 17 18.4	21.2	30.0	23.5	12.5	1.6	17.87*d*	. .	30.254	69.5	63.3	75.9	69
	†23	Saturn, N. L.	4	. . . .	52 16 67.2	69.5	79.6	71.5	71.5	51.7	68.50*d*	. .	30.256	69.8	64.5	75.5	71
	†24	Saturn, S. L., (Mic.)	4	. . . .	"	"	"	"	"	"	"	29.728					
	25	Venus, S. L.	4	. . . .	16 33 25.0	24.2	37.4	25.2	16.8	6.0	22.43	. .	30.294	71.7	77.4	73.5	75.
	26	Venus, N. L., (Mic.)	4	. . . .	"	"	"	"	"	"	"	30.226					
4	27	Sun, S. L., (Mic.)	3	− 0 15.3	21 54 65.2	60.7	76.0	61.3	56.3	47.0	61.08	30.274	30.276	76.3	82.0		80.
	28	Sun, N. L.	5	+ 0 19.3	21 22 66.2	62.2	76.2	62.3	59.5	47.4	62.30	. .					
	29	β Draconis	4	. . . .	346 28 34.8	29.0	46.5	31.4	23.5	17.7	30.49	. .	30.184	77.5	73.5		76.5
	30	γ Draconis	5	. . . .	347 22 62.2	59.2	74.5	59.7	55.3	46.0	59.48	. .	30.182	77.0	73.0		
	†31	μ^1 Sagittarii	4	. . . .	59 57 35.3	32.2	46.6	35.5	23.7	19.2	32.08*d*	. .	30.130	77.0	72.0	75.0	75.5
	32	α Lyræ	4	. . . .	0 14 46.2	43.4	57.3	46.0	35.6	29.7	43.03	. .	30.180	76.5	71.5		
	33	β Lyræ	4	. . . .	5 41 64.4	62.3	76.2	64.3	56.3	47.4	61.82	. .		76.0	70.6		
	34	Moon, N. L.	4	. . . .	57 37 65.2	64.2	76.4	64.0	58.7	49.0	62.92	. .	30.174	75.8	70.0		
	35	ζ Aquilæ	4	. . . .	25 14 39.8	37.3	50.4	39.2	28.3	21.2	36.03	. .	30.174	75.8	70.0		75.
	36	δ Aquilæ	4	. . . .	36 3 59.6	57.0	69.7	58.7	50.0	40.2	55.87	. .	30.172	75.5	69.8		
	37	γ Aquilæ	4	. . . .	28 38 21.3	19.5	32.4	22.3	14.5	3.3	18.88	. .	30.168	75.0	69.0		73.
	38	α Aquilæ	6	. . . .	30 24 52.5	49.5	63.6	52.4	43.6	35.0	49.43	. .					
	39	β Aquilæ	4	. . . .	32 50 71.0	70.0	81.0	72.4	64.0	53.7	68.68	. .	30.168	75.0	69.0		
	40	α^2 Capricorni	4	. . . .	51 52 75.0	75.3	84.6	76.0	68.0	58.6	72.92	. .	30.156	74.0	69.0		73.
	41	α Cygni	4	. . . .	354 9 31.4	39.5	44.4	32.0	23.0	15.2	29.25	. .	30.158	74.0	68.0		75.
	42	61^1 Cygni	4	. . . .	0 53 37.8	38.3	50.4	40.2	29.0	22.2	36.32	. .	30.154	73.8	68.3	74.0	73.
	†43	Venus, S. L.	4	. . . .	16 35 20.0	19.5	31.8	19.8	11.6	2.3	17.50	. .	30.150	75.8	82.4	74.2	78.
	44	Venus, N. L., (Mic.)	4	. . . .	"	"	"	"	"	"	"	30.232					
5	45	Sun, N. L., (Mic.)	1†	− 0 46.0	21 39 16.9	16.9	27.5	15.8	11.1	1.1	14.88	30.080	30.132	81.0	87.0	74.5	84.
	46		2	0 30.0	"	"	"	"	"	"	"	.072					
	47		3	− 0 14.0	"	"	"	"	"	"	"	.064					
	48		4	+ 0 2.0	"	"	"	"	"	"	"	.071					
	49	Sun, S. L., (Mic.)	5†	0 20.0	22 10 40.2	40.2	52.0	40.2	30.7	24.3	37.93	29.810			86.6		84.
	50		6†	0 33.0	"	"	"	"	"	"	"	.810					
	†51		7	+ 0 51.0	"	"	"	"	"	"	"	.790					
	52	Polaris, S. P.	5	− 9 25.0	307 23 75.2	69.0	84.1	70.0	64.4	59.5	70.37	. .	30.080	82.8	88.5	75.5	86.

DATE.	MICROMETER. Coincid.	Val. 1 r.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Aug. 3,		62.76	†Moon	1	16 19.11
			†Saturn	23	0 8.75
7h.	30.008		Venus	25	0 6.82
" 4,			Sun	27	15 51.49
			Venus	43	0 7.14
" 5, 9h.	30.002		Sun	45	15 49.94

Aug. 4. Error of Runs —0″.13. Temp. of circle 75° ; of stone 75°
Aug. 5. do. do. .30 do. do. 80° do. 76°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 34.29	—49 28.88	58 11 42.77	62.41	— 19 18 1.11		C.
33.80						
33.35						
5.42	49 15.22					
4.48						
5.40						
5.04						
0 2.18	1 2.26	312 17 39.65		+ 86 36 2.62	—13.08	
0 0.05	.22	38.86				
0 2.50	— 1 2.18	38.60				
0 0.08	+ 0 0.24	0 14 43.54		+ 38 38 58.12	8.57	
0 0.13	0 5.66	5 42 7.44		+ 33 11 34.22	— 4.99	
0 0.02	+ 0 26.74	25 15 2.00		+ 13 38 39.66	+ 1.17	
0 0.12	0 0.00	0 0 16.85		+ 38 53 24.81	2.58	
0 3.86	1 7.74	310 2 29.90	62.19	+ 88 51 11.36	27.19	
0 0.93	.74	29.24				
-0 0.07	.74	30.39				
-0 0.69	.80	30.36				
-0 2.91	— 1 7.93	30.50				
-0 0.09	+ 0 0.88	0 53 37.21	61.97	+ 38 0 4.45	47.87	
-0 3.43	0 0.88	0 53 40.73		+ 38 0 0.93	47.08	
—0 0.05	0 9.36	9 17 27.18		+ 29 36 14.04	+37.61	
—0 0.05	1 12.94	52 18 30.14		— 13 24 48.92		
+0 17.43	1 12.96					
+0 0.08	0 14.74	16 33 30.43	63.06	+ 22 20 11.88		P.
—0 13.56	0 14.74					
—0 16.31	0 19.10	21 39 12.38		+ 17 14 29.93		
0.00	+ 0 18.59					
+0 0.09	— 0 13.46	346 28 17.12	62.16	+ 52 25 24.29	—31.93	
+0 0.28	— 0 12.54	347 22 47.22		+ 51 30 54.19	23.59	
—0 0.04	+ 1 36.66	59 59 8.70		— 21 5 27.29	7.26	
0.06	0 0.23	0 14 43.20	61.85	+ 38 38 57.90	8.81	
—0 0.02	+ 0 5.62	5 42 7.42		+ 33 11 33.68	— 5.22	
+0 0.10	—32 56.85	57 5 6.17		— 18 11 25.07		
0.01	+ 0 26.55	25 15 2.59		+ 13 38 38.51	+ 1.00	
0.05	0 41.00	36 4 36.92		+ 2 49 4.18	7.42	
0.05	0 30.80	28 38 49.73		+ 10 14 51.37	13.42	
0.07	0 33.11	30 25 22.61		+ 8 28 18.49	16.05	
0.00	0 36.42	32 51 45.10		+ 6 1 56.00	14.54	
0.06	+ 1 11.75	51 54 24.73		— 13 0 43.63	22.96	
0.02	— 0 5.78	354 9 23.49		+ 44 44 17.61	30.19	
+0 0.04	+ 0 0.88	0 53 37.24		+ 38 0 3.86	+47.55	
—0 0.01	0 14.55	16 35 24.90	62.73	+ 22 18 17.08		C.
14.29	0 14.54					
4.11	0 18.54	21 55 19.38		+ 16 58 22.60		
3.93						
3.65						
—0 4.23						
+0 11.89	+ 0 19.05					
11.87						
+0 13.24						
—0 4.52	— 1 10.75	307 22 55.10				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
August 3.		7*h*.					
179° 59′	66″5	64″8	77″5	66″0	57″5	48″7	63″50
	65.0	65.5	78.0	63.8	60.2	45.8	63.05
	66.4	64.8	77.5	66.0	57.5	48.3	63.42
P.	65.8	65.5	78.8	64.6	60.4	46.0	63.51
	65.3	64.3	77.3	64.6	57.0	46.8	62.55
	65.3	65.2	78.4	64.0	59.7	46.0	63.12
Means	65.72	65.02	77.92	64.83	58.72	46.93	63.188 —.134
August 4.		20*h*.,	15*m*.				
179 59	65.2	63.0	75.6	64.8	55.3	49.5	62.23
	63.6	64.2	76.3	63.5	57.6	46.5	61.95
	64.5	62.8	75.7	65.0	54.2	48.8	61.83
P.	63.3	63.7	76.0	63.8	57.4	46.6	61.80
	64.7	63.0	75.3	64.4	54.2	48.4	61.67
	63.7	64.4	76.5	64.7	58.2	47.2	62.45
Means	64.17	63.52	75.90	64.37	56.15	47.83	61.989 —.133
August 5.		12*h*.,	30*m*.				
179 59	65.1	64.0	76.7	62.1	58.0	49.0	62.48
	65.2	64.7	77.4	62.1	59.6	48.9	62.98
	65.8	64.5	77.1	62.9	59.0	48.6	62.98
C.	65.0	65.0	76.9	62.2	59.5	48.9	62.92
	65.0	64.2	76.8	62.0	58.9	48.4	62.55
	65.6	65.1	77.1	63.0	59.9	48.9	63.27
Means	65.28	64.58	77.00	62.38	59.15	48.78	62.864 —.137

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
3, No. 3	73.5	77.0	75.0
4, " 1	74.5	75.0	74.5
5, " 1	75.5	85.5	80.4
		86.0	80.3

1 to 3. Extreme luminous points observed. Correction for defective illumination, +2″.22. Dec. by observation of N. L., —19°17′ 56″.60.
11. Atmosphere misty.
14. Cor. for divisions, —0″.13.
13, 22, 43 to 51. Very unsteady.
23, 24. Observed diameter too small.
31. Cor. for divisions, —0″.10.
Nadir Point, Aug. 5. Apparent error of collimation, 5″E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOM At.	Ext.	St.
			No.	M. s.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°
August 6	1	δ Aquilæ	4	. . . .	36 3 62.7	59.4	72.7	59.0	54.2	43.0	58.50	. .	30.108	81.0	77.5	
	2	γ Aquilæ	4	. . . .	28 38 22.7	19.3	32.8	22.2	15.0	4.4	19.40	. .	30.106	80.6	76.8	
	3	α Aquilæ	4	. . . .	30 24 57.0	53.0	67.0	54.3	50.0	37.5	53.13	. .				
	4	β Aquilæ	4	. . . .	32 50 74.7	72.4	84.2	74.0	67.5	57.0	71.63	. .	30.106	80.5	77.0	
	5	α Cygni	4	. . . .	354 9 33.3	29.6	44.4	32.0	23.2	15.8	29.72	. .	30.112	80.0	76.3	80.0
	†6	Venus, S. L.	4	. . . .	16 40 64.1	64.1	73.9	63.0	55.1	44.9	60.85	. .	30.172	81.2	86.5	79.2
	†7	Venus, N. L., (Mic.) . .	4	. . . .	“	“	“	“	“	“	“	30.233				
7	8	β Aquilæ	4	. . . .	32 50 71.8	72.9	80.9	72.6	65.0	55.1	69.72	. .	30.170	77.8	72.6	80.8
	9	α¹ Capricorni, (Mic.) . .	6	. . . .	”	”	”	”	”	”	”	32.200	30.170	77.5	72.9	
	10	α² Capricorni	4	. . . .	51 53 16.2	17.1	27.0	17.6	8.9	0.2	14.50	. .				
	11	α Cygni	4	. . . .	354 9 29.9	30.5	44.4	30.5	23.0	14.5	28.80	. .	30.168	77.0	73.4	
	12	61¹ Cygni	4	. . . .	0 53 36.0	36.9	49.0	37.8	28.1	20.2	34.67	. .			73.4	
	†13	61² Cygni, (Mic.)	4	. . . .	“	“	“	“	“	“	“	29.951				
	14	ζ Cygni	4	. . . .	9 17 20.9	21.0	32.6	21.4	14.0	2.2	18.68d	. .	30.162	77.0	73.5	
	15	β Aquarii	4	. . . .	45 6 68.4	68.1	78.9	70.0	59.3	50.7	65.90	. .	30.162	77.0	73.1	
	†16	β Cephei	5	. . . .	329 0 53.6	53.2	67.0	54.0	44.1	37.6	51.58	. .			73.2	
	17	ε Pegasi	4	. . . .	29 42 31.3	31.7	43.7	33.2	23.0	15.0	29.65d	. .	30.160	76.5	73.1	
	†18	Moon, S. L., (Mic.) . .	1†	— 0 41.7	47 20 74.2	72.2	84.1	73.6	66.1	56.1	71.05	29.321	30.158	76.5	73.1	80.5
	19		2†	0 27.7	“	“	“	“	“	“	“	.381				
	†20		3†	— 0 13.8	“	“	“	“	“	“	“	.411				
	†21	Moon, N. L. .	5	+ 0 15.0	46 47 57.2	55.9	67.0	56.9	47.8	37.8	53.77d	. .				
	22	(Mic.)	6	0 31.3	“	“	“	“	“	“	“	30.081				
	†23	(Mic)	7	+ 0 48.4	“	“	“	“	“	“	“	.110				
	†24	ξ Pegasi	4	. . . .	28 50 65.1	65.9	77.9	69.1	59.0	48.6	64.27	. .	30.150	76.2	72.6	
	†25	α Piscis Australis . . .	4½	. . . .	69 16 60.1	62.1	74.1	65.7	53.2	45.0	60.03	. .	30.148	76.0	72.7	
	26	α Pegasi	4	. . . .	24 29 77.6	77.1	88.9	80.3	68.9	59.9	75.45	. .	30.146	76.0	72.9	
8	27	α Ophiuchi	4	. . . .	26 12 29.2	25.4	39.1	26.2	18.0	9.1	24.50d	. .	30.038	83.2	81.2	80.5
	28	γ Draconis	4	. . . .	347 22 62.5	58.0	74.7	58.6	53.7	45.5	58.83	. .		83.0	80.5	
	†29	μ¹ Sagittari	4	. . . .	59 57 38.3	33.2	49.9	36.6	25.6	21.2	34.13d	. .				
	30	α Lyræ	4	. . . .	0 14 46.0	42.0	57.7	44.8	36.2	29.0	42.62	. .	30.040	82.5	81.0	
	31	β Lyræ	4	. . . .	5 41 65.3	61.0	76.6	63.2	56.0	47.0	61.52	. .				
	32	ζ Aquilæ	4	. . . .	25 14 40.7	36.6	52.3	38.4	27.8	20.0	35.97	. .	30.042	82.5	80.3	
	33	δ Aquilæ	4	. . . .	36 3 62.2	57.0	71.4	58.0	49.8	42.3	56.78	. .		82.2	80.2	
	34	γ Aquilæ	4	. . . .	28 38 22.6	18.0	32.6	20.6	13.8	4.0	18.60	. .	30.036	62.0	79.0	
	35	α Aquilæ	4	. . . .	30 24 52.3	50.0	75.2	51.8	44.3	35.8	51.90	. .				
	36	β Aquilæ	4	. . . .	32 50 74.4	71.0	84.0	72.3	65.6	56.4	70.62	. .	30.034	82.0	79.3	
	37	α² Capricorni	4	. . . .	51 53 19.3	16.0	28.8	18.0	9.2	1.0	15.38	. .	30.030	81.5	79.0	
	38	α Cygni	5	. . . .	354 9 33.0	28.5	44.7	29.5	22.5	15.3	28.92	. .	30.032	81.3	78.3	
	39	61¹ Cygni	4	. . . .	0 53 38.7	36.0	50.5	37.8	29.3	21.2	35.58	. .	30.028	81.0	78.0	
10	40	α Ophiuchi	4	. . . .	26 12 26.5	26.0	38.0	27.5	16.4	8.5	23.82d	. .	29.912	79.8	75.1	81.5
	41	α Lyræ	4	. . . .	0 14 45.0	43.2	58.2	46.2	34.3	28.5	42.57	. .	29.924	78.2	73.4	
	42	β Lyræ	4	. . . .	5 41 62.4	62.0	75.9	63.2	55.1	46.0	60.77d	. .			73.4	
	43	ζ Aquilæ	5	. . . .	25 14 38.5	38.1	50.1	39.3	27.1	19.6	35.45	. .	29.928	77.5	73.2	
	†44	η Lyræ	4	. . . .	0 0 19.3	18.3	32.0	21.1	11.9	1.3	17.32	. .				
	45	δ Aquilæ	4	. . . .	36 3 59.2	59.1	71.6	59.2	50.8	40.2	56.68	. .	29.926	77.0	72.6	
	46	γ Aquilæ	4	. . . .	28 38 20.9	21.0	34.1	22.2	14.9	3.0	19.35	. .	29.926	77.0	70.7	
	47	α Aquilæ	4	. . . .	30 24 51.9	52.9	64.9	52.9	44.9	34.4	50.32	. .				
	48	β Aquilæ	4	. . . .	32 50 70.9	72.4	82.1	72.2	65.0	53.6	69.37	. .	29.928	76.5	70.9	81.0
	49	α¹ Capricorni	4	. . . .	51 50 58.3	60.8	70.5	60.0	50.6	41.4	56.93	. .	29.928	76.2	70.0	
	†50	α² Capricorni, (Mic.) . .	4	. . . .	“	“	“	“	“	“	“	27.819				
	51	α Cygni	4	. . . .	354 9 31.4	30.3	45.2	32.6	22.9	14.6	29.45	. .	29.934	75.0	69.2	81.0
11	†52	Sun, S. L., (Mic.) . .	2	— 0 20.0	23 52 38.8	36.2	51.6	37.3	27.3	19.5	35.12d	29.484	30.090	78.0	81.9	

DATE.	MICROMETER. Coincid.	Val. 1 r.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Aug 6,		62.76	Venus .	6	0 6.87
“ 7, 22h.	30.012		†Moon .	18	16 48.88
“ 11, 10h.	30.006				

Aug. 7. Error of Runs —0″.07. Temp. of circle 77°; of stone 80°
Aug. 8. do. do. +0.31 do. do. 82° do. 80°
Aug. 10. do. do. —0.07 do. do. 77° do. 81°
Aug. 11. do. do. +0.03 do. do. 75° do. 75°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
Instrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
+0 0.06	+ 0 40.31	36 4 32.87	62.51	+ 2 49 2.89	+ 7.22	P.
0.11	0 30.28	28 38 49.79		+ 10 14 51.97	13.10	
+0 0.01	0 32.54	30 25 25.68		+ 8 28 16.08	15.74	
—0 0.04	+ 0 35.78	32 51 47.37		+ 6 1 54.39	14.25	
+0 0.02	— 0 5.68	354 9 24.06		+ 44 44 17.70	29.55	
—0 0.05	+ 0 14.53	16 41 8.46	61.98	+ 22 12 32.77		C.
—0 13.79	0 14.53					
+0 0.03	0 36.16	32 51 45.91		+ 6 1 55.32	14.12	
—2 17.08	1 11.14	51 52 8.56		— 12 58 27.33	22.72	
—0 0.01	+ 1 11.23	51 54 25.72		— 13 0 44.49	22.84	
0.00	— 0 5.72	354 9 23.08		+ 44 44 18.15	29.24	
+0 0.02	+ 0 0.87	0 53 35.56		+ 38 0 5.67	46.62	
3.81	0 0.87	0 53 39.35		+ 38 0 1.88	45.83	
0.06	0 9.14	9 17 27.88		+ 29 36 13.35	36.52	
0.06	+ 0 56.12	45 8 2.08		+ 6 14 20.85	38.76	
0.35	— 0 33.59	329 0 18.34		+ 69 53 22.89	45.99	
0.06	+ 0 31.92	29 43 1.63		+ 9 10 39.60	42.27	
34.93	—43 40.60	46 21 16.23		— 7 27 35.00		
34.03						
35.04						
3.09	—43 29.10					
1.15						
3.84						
+0 0.04	+ 0 30.84	28 51 35.15		+ 10 2 6.08	52.50	
—0 0.02	2 26.74	69 19 26.75		— 30 25 45.52	48.20	
0.00	0 25.50	24 30 40.95		+ 14 23 0.28	+56.40	
+0 0.05	+ 0 27.01	26 12 51.56	62.33	+ 12 40 50.02	—26.43	P.
+0 0.15	— 0 12.30	347 22 46.68		+ 51 30 54.90	24.45	
—0 0.04	+ 1 34.67	59 59 8.76		— 21 5 27.18	7.25	
0.06	0 0.23	0 14 42.79		+ 38 38 58.79	9.57	
—0 0.08	0 5.48	5 42 6.92		+ 33 11 34.66	— 6.11	
+0 0.02	0 25.92	25 15 1.91		+ 13 38 39.67	+ 0.37	
0.07	0 40.03	36 4 36.88		+ 2 49 4.70	7.03	
0.12	0 30.08	28 38 48.80		+ 10 14 52.78	12.79	
-0 0.01	0 32.32	30 25 24.23		+ 8 28 17.35	15.45	
-0 0.04	0 35.55	32 51 46.13		+ 6 1 55.45	13.98	
-0 0.11	+ 1 10.09	51 54 25.58		— 13 0 44.00	22.81	
0.03	— 0 5.64	354 9 23.31		+ 44 44 18.27	28.92	
0.10	+ 0 0.86	0 53 36.54		+ 38 0 5.04	+46.31	
0 0.06	0 27.20	26 12 51.08	62.32	+ 12 40 50.49	—26.64	C.
0 0.07	0 0.24	0 14 42.74		+ 38 38 58.83	10.00	
0 0.08	0 5.54	5 42 6.39		+ 33 11 35.18	— 6.54	
0 0.02	0 26.17	25 15 1.64		+ 13 38 39.93	+ 0.06	
0.13	0 0.00	0 0 17.19		+ 38 53 24.38	0.81	
0.00	0 40.45	36 4 37.13		+ 2 49 4.44	6.85	
0.01	0 30.45	28 38 49.79		+ 10 14 51.78	12.49	
0.00	0 32.72	30 25 23.04		+ 8 28 18.53	15.16	
0.04	0 36.00	32 51 45.41		+ 6 1 56.16	13.72	
0.03	1 10.97	51 52 7.93		— 12 58 26.36	22.62	
2 17.01	+ 1 11.07	51 54 25.01		— 13 0 43.44	22.74	
0.02	— 0 5.73	354 9 23.70		+ 44 44 17.87	28.31	
33.18	—15 27.56	23 37 40.74	62.10	+ 15 16 0.61		P.

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
August 7.		20h.,	30m.				
179° 59′	63″9	63″9	76″0	63″9	55″6	48″0	61″88
	63.0	64.1	76.8	63.0	57.3	46.8	61.83
C.	63.6	64.2	76.4	63.9	57.0	47.5	62.10
	64.0	64.9	77.0	64.4	57.9	48.0	62.70
Means	63.62	64.28	76.55	63.80	56.95	47.57	62.128 —.133
August 7.		20h.,	45m.				
179 59	62.9	64.8	76.2	62.9	57.8	46.4	61.87
	62.9	64.9	76.1	63.5	57.8	46.2	61.90
C.	63.7	64.3	56.1	64.1	56.6	47.6	62.07
	64.0	65.2	76.8	64.4	58.1	47.0	62.58
Means	63.38	64.82	76.30	63.73	57.57	46.80	62.100 —.133
August 8.		20h.,	15m.				
179 59	67.0	62.6	77.5	63.4	55.3	49.0	62.47
	65.6	63.6	78.0	62.7	57.8	47.0	62.45
	67.0	63.2	77.5	64.2	56.0	49.4	62.88
P.	65.2	64.2	77.6	62.2	57.5	47.0	62.28
	66.8	63.0	77.2	64.4	55.3	49.2	62.65
	65.5	63.3	77.0	63.0	56.2	47.5	62.08
Means	66.18	63.32	77.47	63.32	56.35	48.18	62.469 —.135
August 10.		21h.					
179 59	63.4	64.8	77.3	64.8	55.6	46.6	62.08
	64.1	65.1	78.0	65.7	57.1	47.1	62.85
	63.2	65.0	77.9	64.1	56.1	46.9	62.20
C.	63.1	65.2	77.9	64.9	57.0	46.6	62.45
	63.4	65.2	77.9	65.1	57.0	46.4	62.50
	63.2	65.7	78.0	65.0	57.4	46.4	62.62
Means	63.40	65.17	77.83	64.93	56.70	46.67	62.450 —.132
August 11.		23h.					
179 59	65.0	63.3	77.0	65.3	54.5	47.4	62.08
	63.0	64.0	77.6	63.4	56.8	45.3	61.68
	65.0	64.0	77.6	66.0	55.3	48.0	62.65
P.	63.3	65.0	78.0	64.2	57.6	45.2	62.22
	65.0	64.0	77.0	66.0	55.4	48.0	62.57
	63.2	65.0	78.0	64.0	57.8	45.3	62.22
Means	64.08	64.22	77.53	64.82	56.23	46.53	62.236 —.133

THERMOMETERS.

R POINTS.	Stone.	Upper.	Lower.
	°	°	°
7, No. 1	80.7	77.5	78.0
" 2	80.7	78.3	79.6
8, " 1	80.5	82.0	81.5
10, " 1	81.0	74.7	76.0
		77.2	78.0
11, " 1	74.0	75.5	76.0

6, 7. Very unsteady ; observed diameter too small.
13. 61² Cygni follows 61¹, 1s.40, (3 wires.)
16, 24, 25. Faint: through mist.
18 to 20. Cor. of S. L. for defective illumination, +12″.31.
21 to 23. Declination by observation of N. L. —7°27′27″.86.
29. Cor. for divisions —0″.10.
44. Cor. for divisions —0″.13.
50. α² Capricorni follows α¹ 24s.24, (5 wires.)
52. Obscured immediately after.
Nadir Point, August 7. Apparent error of collimation, 5″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.									Barometer.	THERMOMETE			
						A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.
			No.	M. S.	° ′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
August 11	1	α Cygni	4	. . .	354 9	30.0	28.8	44.5	31.4	21.5	12.2	28.07	. .	30.120	74.0	70.8	75.5	74.
	2	61¹ Cygni	4	. . .	0 53	35.7	35.6	48.7	38.7	26.0	18.7	33.90	. .	30.120	73.8	71.7		73.
	†3	Venus, N. L.	4	. . .	17 5	62.0	62.6	74.2	62.9	53.1	43.1	59.65	. .	30.182	76.4	79.0	77.0	79.
	4	Venus, S. L. (Mic.) . .	4	. . .		“	“	“	“	“	“	“	29.779					
12	5		1	— 0 46.0	24 10	64.9	65.1	76.1	64.9	56.6	46.6	62.37	29.958	30.168	79.7	82.4	77.0	81.
	6	Sun, S. L., (Mic.) . .	2	0 30.0		“	“	“	“	“	“	“	.956					
	7		3	— 0 13.0		“	“	“	“	“	“	“	.959					
	8		4†	+ 0 5.0	23 39	21.9	21.9	31.6	22.0	12.4	4.0	18.97	29.912			82.7		81.
	9	Sun, N. L., (Mic.) . .	5†	0 19.0		“	“	“	“	“	“	“	.900					
	10		6†	0 34.0		“	“	“	“	“	“	“	.918					
	11		7	+ 0 49.0		“	“	“	“	“	“	“	.911					
	12		5	— 9 28.5	307 23	76.0	73.2	87.0	73.2	66.6	58.0	72.33	. .	30.112	81.2	82.7	77.0	83.
	13	(Mic.)		6 49.5									30.057					
	14	(Mic.)		6 29.5									.049					
	15	(Mic.)		6 9.5									.050					
	16	(Mic.)		5 49.5									.050					
	17	(Mic.)		5 29.0									.058					
	18			— 4 6.5		72.0	69.1	83.0	69.2	62.1	54.1	68.25	. .					
	19	Polaris, S. P. .	4	+ 0 21.5		71.0	68.1	81.7	67.9	60.7	53.0	67.07	. .			83.0		82.
	20			4 47.5		72.1	69.9	83.6	70.8	63.0	54.9	69.05	. .					
	21	(Mic.)		6 20.5									29.987					
	22	(Mic.)		6 40.5									.973					
	23	(Mic.)		7 0.5									.973					
	24	(Mic.)		7 20.5									.975					
	25	(Mic.)		7 40.5									.971					
	26		3†	+10 20.5		76.1	74.4	88.3	74.4	67.1	58.9	73.20	. .	30.108	81.0	82.9		82.
	27	Saturn, N. L.	4	. . .	52 31	42.6	42.0	55.0	45.8	31.5	26.1	40.50	. .	30.078	75.7	71.4	77.4	75.
	28	Saturn, S. L., (Mic.) . .	4	. . .		“	“	“	“	“	“	“	29.712					
	29	α Piscis Australis . . .	4	. . .	69 16	62.2	63.1	75.2	66.2	54.2	45.6	61.08	. .	30.078	75.7	71.2		
	30	α Ursæ Majoris, S. P. . .	4	. . .	281 32	51.9	53.1	65.6	55.5	42.7	34.6	50.57*d*	. .	30.078	75.7	71.2		76.
17	31	Venus, S. L.	4	. . .	17 56	60.6	60.1	73.5	60.8	50.1	41.4	57.75*d*	. .	30.062	76.0	76.6		78.
	†32	Venus, N. L., (Mic.) .	4	. . .		“	“	“	“	“	“	“	30.215					
18	33	ε Pegasi	4	. . .	29 42	28.3	30.6	43.5	31.6	20.5	10.2	27.46*d*	. .	30.132	76.5	66.4		71.
	†34	Saturn, N. L.	5	. . .	52 41	30.0	32.1	45.3	35.0	21.2	13.1	29.25	. .	30.132	72.0	66.0	79.0	71.
	†35	Saturn, S. L., (Mic.) . .	5	. . .		“	“	“	“	“	“	“	29.716					
	36	α Piscis Australis . . .	4	. . .	69 16	57.6	61.1	74.2	63.0	50.2	41.6	57.95	. .	30.128	72.5	65.3		74.
	37	α Pegasi	4	. . .	24 29	75.0	75.4	88.9	76.9	66.8	54.5	72.92	. .	30.127	72.2	65.3		72.
31	38	Moon, N. L.	4	— 0 1.4	58 7	50.3	47.4	63.4	50.7	39.7	33.2	47.45*d*	. .	30.128	81.0	78.0	77.0	81.
	39	α Lyræ	4	. . .	0 14	41.6	37.8	53.8	41.2	30.2	24.3	38.15	. .					
	40	γ Aquilæ	4	. . .	28 37	79.0	74.8	90.0	77.7	70.3	59.8	75.27	. .	30.130	80.0	76.5		80.
	41	α Aquilæ	4	. . .	30 24	51.5	46.7	63.0	50.5	40.7	32.3	47.45	. .					
	42	β Aquilæ	4	. . .	32 50	71.0	68.2	82.2	70.3	62.4	52.4	67.75	. .	30.128	80.0	77.0		79.
	43	α² Capricorni	4	. . .	51 52	77.0	73.5	87.2	76.7	67.5	57.6	73.25	. .	30.136	80.0	75.5		79.
	44	α Cygni	4	. . .	354 9	24.2	21.0	37.0	24.2	15.0	5.7	21.18	. .	30.134	79.3	75.8		79.
	45	61¹ Cygni	4	. . .	0 53	31.2	29.0	44.0	31.4	21.2	12.2	28.17	. .	30.134	79.0	75.2		78.
	46	ζ Cygni	4	. . .	9 16	75.2	72.2	86.4	74.4	66.6	54.5	71.55*d*	. .					
	47	α Cephei	4	. . .	336 57	36.4	32.0	50.7	35.2	25.3	18.5	33.02*d*	. .	30.134	79.0	75.2		
	48	β Cephei	4	. . .	329 0	44.4	42.0	60.0	44.3	33.8	26.5	41.83	. .	30.132	79.0	75.0		
	49	ε Pegasi	4	. . .	29 42	27.6	24.1	38.8	27.8	17.3	8.1	23.95*d*	. .	30.132	78.7	74.7		
	50	Saturn, S. L.	4	. . .	53 2	33.7	31.3	44.7	34.8	21.4	14.5	30.07*d*	. .	30.128	78.3	73.5	77.5	77.
	51	Saturn, N. L., (Mic.) .	4	. . .		“	“	“	“	“	“	“	30.289					
September 1	52	α¹ Capricorni, (Mic.) . .	5½	. . .	51 53	15.4	14.3	25.9	16.1	6.2	7.1	14.17	32.189	30.132	79.7	74.1		79.

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Aug. 11,		62.76	Venus .	3	0 7.00
“ 12, 10*h*.	30.002		Sun . .	5	15 50.73
			Saturn .	27	0 9.11
“ 17,			Venus .	31	0 6.22
“ 18, 22*h*.	30.015		Saturn .	34	0 9.28
“ 31, 22*h*.	30.007		Saturn .	50	0 8.73

Aug. 12. Error of Runs +0″.04. Temp. of circle 76° ; of stone 79°
Aug. 18. do. −0.26 do. 74° do. 79°
Aug. 31. do. +0.18 do. 78° do. 77°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 0.00	+ 0 5.75	354 9 22.32	62.10	+ 44 44 19.03	+28.00	P.
0 0.02	0 0.87	0 53 34.79		+ 38 0 6.56	45.39	
0 0.03	0 15.19	17 6 21.81	62.32	+ 21 47 19.76		C.
0 13.95	0 15.21					
3.44	0 21.97	23 55 36.78		+ 14 58 4.79		
3.25						
2.82						
5.62	+ 0 21.41					
6.29						
5.14						
0 5.62						
0 4.60	− 1 10.79	307 22 56.94		+ 88 29 15.24	80.03	
5.37	.78	56.18				
5.03	.78	56.52				
4.86	.77	56.70				
4.66	.77	56.90				
4.95	.77	56.61				
0 0.82	.76	56.67				
0 0.04	.75	56.36				
0 1.14	.75	57.16				
1.13	.76	57.16				
0.48	.76	57.79				
0.71	.76	57.58				
1.15	.76	57.14				
1.10	.76	57.19				
0 5.49	− 1 10.76	56.95				
0.00	+ 1 12.12	52 33 1.73		− 13 39 20.16		
-0 18.21	1 12.13					
-0 0.01	+ 2 26.83	69 19 27.90		− 30 25 46.33	+48.37	
-0 0.06	− 4 26.56	281 28 24.07		+ 62 34 42.50	−69.66	
-0 0.07	+ 0 16.08	17 57 7.68	62.09	+ 20 56 33.66		
-0 12.32	0 16.04					
-0 0.06	0 32.30	29 42 59.82		+ 9 10 41.54	+40.44	
0.11	1 13.48	52 42 52.12		− 13 49 10.78		
18.65	1 13.49					
0.12	2 28.82	69 16 26.89		− 30 25 45.55	48.69	
+0 0.01	+ 0 25.87	24 30 38.80		+ 14 23 2.54	+54.20	
−0 0.02	−32 28.29	57 35 19.14	61.81	− 18 41 38.08		P.
−0 0.05	+ 0 0.23	0 14 38.33		+ 38 39 2.73	−13.90	
+0 0.11	0 30.31	28 38 45.69		+ 10 14 55.37	+ 9.85	
+0 0.01	0 32.57	30 25 20.03		+ 8 28 21.03	12.64	
−0 0.03	0 35.81	32 51 43.53		+ 6 1 57.53	11.47	
+0 0.10	+ 1 10.79	51 54 24.04		− 13 0 42.98	22.41	
0.02	− 0 5.69	354 9 15.51		+ 44 44 25.55	22.30	
0.09	+ 0 0.86	0 53 29.12		+ 38 0 11.94	39.72	
0.08	+ 0 9.10	9 17 20.73		+ 29 36 20.33	30.59	
+0 0.06	− 0 23.68	336 57 9.40		+ 61 56 31.66	33.66	
−0 0.03	− 0 33.44	329 0 8.36		+ 69 53 32.70	37.35	
+0 0.06	+ 0 31.79	29 42 55.80		+ 9 10 45.26	38.60	
+0 0.06	1 13.29	53 3 34.70		− 14 9 53.64		
−0 17.38	1 13.28					
−2 16.53	+ 1 10.88	51 52 8.52	62.20	− 12 58 27.07	+22.28	C.

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
August 12.		12h.,	30m.				
179° 59′	65″4	64″9	77″6	63″9	56″6	47″6	62″67
	64.5	64.4	77.3	63.0	56.0	47.4	62.10
	65.9	64.6	77.3	64.0	55.8	48.7	62.72
C.	65.0	64.1	77.0	62.9	54.9	48.1	62.00
	65.7	64.8	77.1	63.8	55.6	48.4	62.57
	64.5	65.1	77.4	64.5	56.0	48.5	62.67
Means	65.17	64.65	77.28	63.68	55.82	48.12	62.453 —.135
August 12.		22h.,	30m.				
179 59	64.6	64.9	76.1	66.2	55.8	47.9	62.58
	63.1	64.8	76.4	64.9	55.7	46.6	61.92
	64.7	65.4	77.1	65.4	57.1	47.4	62.85
C.	64.1	65.1	77.0	65.2	56.7	47.0	62.52
	64.0	65.0	76.8	65.0	56.5	46.8	62.35
	63.9	65.0	77.1	65.1	56.8	47.0	62.48
Means	64.07	65.03	76.75	65.30	56.43	47.12	62.450 —.133
August 13.		17h.,	30m.				
179 59	68.3	61.2	78.0	63.7	55.3	50.0	62.75
	66.0	62.0	78.0	62.0	57.0	47.2	62.03
P.	68.0	62.2	78.0	64.0	55.7	50.0	62.98
	65.6	61.5	77.0	62.3	55.2	47.0	61.43
Means	66.97	61.73	77.75	63.00	55.80	48.55	62.300 —.133
August 18.		22h.,	30m.				
179 59	61.9	66.1	77.9	65.8	56.1	44.4	61.98
	62.1	66.0	78.0	66.0	55.7	45.0	62.13
	62.6	66.1	77.9	66.0	55.9	45.3	62.30
C.	62.8	66.8	78.6	66.4	56.1	45.6	62.72
	62.2	66.1	77.5	65.9	55.5	45.3	62.08
	62.4	66.1	77.6	65.8	55.6	45.1	62.10
Means	62.33	66.20	77.92	65.98	55.82	45.07	62.220 —.131
August 20.		20h.					
179 59	65.0	64.0	78.8	65.8	54.5	47.0	62.52
	64.2	65.5	79.8	65.8	56.8	45.6	62.95
P.	64.5	64.0	78.3	66.5	54.5	47.3	62.52
	64.0	65.0	79.2	65.6	56.8	45.6	62.70
Means	64.42	64.63	79.02	65.93	55.65	46.37	62.671 —.133
August 29.		21h.,	20m.				
179 59	61.7	64.9	77.9	65.0	57.0	44.5	61.83
	63.1	65.1	77.1	66.1	56.9	46.0	62.38
	62.4	64.8	77.0	64.9	55.9	45.0	61.67
C.	62.2	65.0	76.9	64.9	56.0	45.1	61.68
	63.0	65.4	76.6	65.5	56.1	45.6	62.03
	62.9	64.9	76.9	66.0	56.8	45.7	62.20
Means	62.55	65.02	77.07	65.40	56.45	45.32	61.967 —.133
August 31.		19h.					
179 59	66.3	60.8	76.8	64.0	53.4	47.8	61.52
	65.3	62.8	78.0	63.3	57.0	46.4	62.13
P.	66.3	61.6	77.0	64.4	55.0	48.2	62.08
	65.4	62.8	77.6	63.6	56.5	46.3	62.03
Means	65.82	62.00	77.35	63.83	55.47	47.18	61.940 —.135

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
12, No. 1	77.0	82.7	79.9
" 2	77.4	75.7	76.3
18, " 1	79.0	72.6	74.0
		76.5	76.0
20, " 1	74.0	76.0	75.5
29, " 1	74.7	73.7	73.5
		74.8	73.5
31, " 1	77.0	81.5	79.5

3. Cor. of N. L. for defective illumination —0″.02.
32. Cor. of N. L. for defective illumination —0″.04.
34, 35. Through clouds.
Nadir Points, August 18 & 29. Apparent error of collimation, 6″ E.
Nadir Points, August 13, 20 & 29, used only for Zones.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOME			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	U
			No.	M. S.	° ′ ″	″	″	″	″	″	″	*Revs.*	*In.*	°	°	°	
ptember 1	1	α^2 Capricorni	4	. . .	51 53 15.4	14.3	25.9	16.1	6.2	7.1	14.17	. .					
	2	α Cygni, (Mic.)	4	. . .	354 11 38.6	39.7	53.1	40.6	29.2	22.1	37.22	32.189	30.134	79.0	74.4	78.8	78
	3	61^1 Cygni	4	. . .	0 53 29.0	28.9	42.0	31.4	20.6	12.1	27.33	. .			73.1		
	4	ζ Cygni	4	. . .	9 16 74.8	74.1	87.6	74.7	67.9	54.5	72.27*d*	. .	30.132	78.3	73.5		77
	5	α Cephei	4	. . .	336 59 36.7	35.1	52.3	36.5	27.1	19.1	34.47*d*	. .			72.5		77
	6	β Aquarii	4	. . .	45 6 66.0	65.7	77.6	66.4	56.5	46.5	63.13*d*	. .			72.0		77
	7	ε Pegasi	4	. . .	29 42 26.8	26.6	39.5	29.3	18.4	9.1	24.94*d*	. .	30.126	77.8	72.1		77
	8	Saturn, S. L.	4	. . .	53 3 65.9	65.6	77.1	64.9	57.1	46.1	62.78	. .	30.126	77.2	72.4	78.8	76
	9	Saturn, N. L., (Mic.)	4	. . .	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	30.302					
	10	ζ Pegasi	4	. . .	28 50 62.1	61.1	75.9	63.9	54.8	43.1	60.15	. .	30.130	77.0	71.8		79
	11	α Piscis Australis	4	. . .	69 16 62.6	64.3	77.2	67.3	55.4	45.9	62.12	. .	30.132	77.0	71.8		77
	12	α Ursæ Majoris, S. P.	4	. . .	281 32 50.3	49.7	64.3	52.3	39.4	31.9	47.98*d*	. .	30.126	77.0	71.3	78.6	77
2	13	ζ Aquilæ	4	. . .	25 14 38.7	34.7	49.6	37.0	24.6	17.6	33.70	. .	30.104	81.1	79.5	79.0	81
	14	δ Aquilæ	4	. . .	36 3 60.5	56.2	71.6	57.6	49.0	39.5	55.73	. .	30.108	81.3	79.0		81
	15	γ Aquilæ	4	. . .	28 38 20.8	16.8	31.7	18.8	10.8	0.0	16.48	. .			79.2		
	16	α Aquilæ	4	. . .	30 24 52.4	47.6	64.6	51.0	41.3	32.6	48.25	. .					
	†17	β Aquilæ	4	. . .	32 50 71.8	69.4	83.3	70.7	62.8	53.3	68.55	. .	30.102	80.9	79.0		
	18	Moon, S. L.	4	+ 0 0.3	53 55 49.4	45.4	60.2	48.7	34.8	28.7	44.53	. .	30.096	80.5	78.5		80
	19	α Cygni	4	. . .	354 9 26.0	21.2	38.3	24.2	15.7	6.7	22.02	. .	30.098	80.3	78.4		
	20	61^1 Cygni	4	. . .	0 53 31.0	28.0	43.6	30.6	20.0	11.8	27.50	. .	30.100	80.0	77.8		
	21	ζ Cygni	4	. . .	9 16 76.3	72.4	87.3	74.6	67.1	55.2	72.16*d*	. .					
	22	β Aquarii	4	. . .	45 6 69.0	64.4	80.3	68.0	58.0	47.4	64.52	. .	30.104	80.0	77.5		79
	†23	ε Pegasi	4	. . .	29 42 29.7	25.1	41.3	29.7	18.0	9.8	25.60*d*	. .	30.096	80.0	78.0	79.0	79
4	†24	Venus, S. L.	4	. . .	22 33 26.5	24.1	37.2	26.0	15.5	7.1	22.73	. .	30.151	83.5	85.7	81.3	84
	†25	Venus, N. L., (Mic.)	4	. . .	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	30.210					
5	†26	Sun, S. L., (Mic.)	1	— 0 45.7	33 21 24.0	21.0	34.1	..	..	4.0	19.57	29.852			87.4		85
	27		2	0 29.7	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.841					
	28		3	— 0 14.7	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.844					
	29	Sun, N. L., (Mic.)	4	+ 0 2.3	31 49 35.4	33.0	45.9	34.0	21.0	16.2	30.92	29.899	30.167	85.0	88.7	81.5	86
	30		5	0 17.3	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.876					
	31		6	0 33.3	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.892					
	†32		7	+ 0 48.3	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.894					
6	33	Venus, S. L.	4	. . .	23 14 25.1	22.1	36.5	23.0	13.1	6.0	20.97	. .	30.266	83.2	85.8	83.0	85
	†34	Venus N. L., (Mic.)	4	. . .	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	30.200					
	35	Mercury, S. L.	4	. . .	27 6 26.2	23.2	37.5	27.5	13.1	6.1	22.27	. .	30.258	83.5	86.5		86
	†36	Mercury, N. Cusp. (Mic.)	4	. . .	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	30.149					
7	37	Sun, N. L., (Mic.)	1	— 0 44.5	32 34 29.6	28.1	40.9	30.5	16.9	11.1	26.18	30.060			88.4		86
	38		2	0 30.5	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.059					
	39		3	— 0 14.5	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.054					
	40	Sun, S. L., (Mic.)	4†	+ 0 9.5	33 5 76.1	74.2	85.9	76.9	64.5	56.6	72.37	29.901	30.238	84.8	88.2	83.0	87
	41		5†	0 20.5	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.889					
	42		6	0 33.5	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.899					
	43		7	+ 0 48.5	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	.886					
	44	Saturn, S. L.	4	. . .	53 12 55.6	55.5	68.0	57.0	41.7	37.0	52.47*d*	. .	30.100	77.8	72.0	83.0	77
	45	Saturn, N. L., (Mic.)	4	. . .	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	‘‘	30.319					
	46	ζ Pegasi	4	. . .	28 50 61.5	61.2	76.2	63.8	51.2	43.0	59.48	. .	30.092	77.0	72.7		77
	47	α Piscis Australis	4	. . .	69 16 63.7	64.1	79.9	67.0	54.1	45.6	62.40	. .			72.5		77
	48	α Ursæ Majoris, S. P.	4	. . .	281 32 46.0	45.8	62.1	48.4	33.0	27.0	43.72*d*	. .	30.094	77.0	72.1		77
	49	γ Cephei	4	. . .	322 7 47.5	46.4	64.8	49.2	35.5	29.0	45.40*d*	. .	30.098	76.5	71.3	83.0	79
8	†50	α Lyræ	4	. . .	0 14 43.0	37.2	56.2	41.8	27.4	23.5	38.18	. .	29.890	82.0	78.6	81.0	81
	51	γ Aquilæ	4	. . .	28 37 80.3	75.0	93.2	79.6	68.8	59.8	76.12	. .	29.908	81.5	78.5		8
	†52	α Aquilæ	4	. . .	30 24 52.0	47.4	65.7	51.6	38.5	32.7	47.97	. .					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 r.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
pt. 1, 21*h*.	30.010	62.75	Saturn .	8	0 9.08
‘‘ 4,			Venus .	24	0 6.36
‘‘ 5,			Sun . .	26	15 56.35
‘‘ 6,			Venus .	33	0 6.16
			Mercury	35	0 4.66
‘‘ 7, 12*h*.	30.003		Sun . .	37	16 58.44
			Saturn .	44	0 9.82

Sept. 1. Error of Runs +0″.30. Temp. of circle 78°; of stone 78°
Sept. 2. }
Sept. 5. } do. .24 do. 80° do. 80°
Sept. 7. }
Sept. 8. do. .26 do. 80° do. 80°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.13	+ 1 10.97	51 54 25.27	62.20	− 13 0 43.82	+22.41	C.
-2 16.70	− 0 5.70	354 9 14.82		+ 44 44 26.63	22.04	
-0 0.08	+ 0 0.87	0 53 28.28		+ 38 0 13.17	39.46	
0.07	+ 0 9.13	9 17 21.47		+ 29 36 19.98	30.38	
0.06	− 0 23.80	336 57 10.73		+ 61 56 30.72	33.35	
0.08	+ 0 56.17	45 7 59.38		− 6 14 17.93	37.39	
0.06	0 31.93	29 42 56.93		+ 9 10 44.52	38.47	
+0 0.04	1 13.52	53 5 7.26		− 14 11 25.81		
−0 18.11	1 13.51					
0.05	0 30.86	28 51 30.96		+ 10 2 10.49	48.40	
−0 0.04	+ 2 26.92	69 19 29.00		− 30 25 47.55	+49.82	
+0 0.05	− 4 26.92	281 28 21.11		+ 62 34 39.66	−63.74	
0.03	+ 0 26.01	25 14 59.74	62.42	+ 13 38 41.93	− 2.71	P.
0.08	0 40.20	36 4 36.01		+ 2 49 5.66	+ 5.88	
0.18	0 30.14	28 38 46.80		+ 10 14 54.87	9.66	
+0 0.01	0 32.40	30 25 20.66		+ 8 28 21.01	12.46	
−0 0.05	+ 0 35.65	32 51 44.15		+ 6 1 57.52	11.30	
0.00	−64 10.65	52 51 33.88		− 13 57 52.21		
+0 0.04	− 0 5.66	354 9 16.40		+ 44 44 25.27	21.78	
0.12	+ 0 0.86	0 53 28.48		+ 38 0 13.19	39.20	
+0 0.08	0 9.05	9 17 21.29		+ 29 36 20.38	30.16	
−0 0.07	0 55.55	44 8 0.00		− 6 14 18.33	37.35	
+0 0.06	0 31.56	29 42 57.22		+ 9 10 44.45	38.35	
+0 0.14	0 20.49	22 33 37.00	62.40	+ 16 20 4.65		C.
−0 12.47	0 20.38					
+0 10.37	0 29.93	32 6 3.66		+ 6 47 37.99		
10.78						
10.36						
6.76	0 29.30					
8.03						
6.86						
6.64						
-0 0.04	0 21.29	23 14 36.14	62.37	+ 15 39 5.48		
-0 12.17	0 21.18					
0.08	0 23.37	27 6 40.90		+ 11 47 0.72		
9.13	0 23.09					
2.84	0 29.54	32 50 51.32		+ 6 2 50.30		
3.06						
-0 2.91						
-0 6.20	0 30.90					
6.80						
6.04						
6.69						
-0 0.06	1 13.91	53 13 56.62	62.69	− 14 20 14.68		
-0 19.56	1 13.89					
0.00	0 30.77	28 51 30.25		+ 10 2 11.69	47.60	
-0 0.03	+ 2 26.53	69 19 28.96		− 30 25 47.02	+50.45	
0.06	− 4 26.24	281 28 17.54		+ 62 34 35.60	−61.84	
-0 0.06	− 0 43.55	322 7 1.91		+ 76 46 40.03	+63.25	
-0 0.05	+ 0 0.23	0 14 38.36	62.76	+ 38 39 3.65	−14.74	P.
-0 0.14	0 29.98	28 38 46.24		+ 10 14 55.77	+ 9.12	
-0 0.01	+ 0 32.24	30 25 20.22		+ 8 28 21.79	+11.95	

NADIR POINTS—READINGS.

	A.	B.	C.	D	E.	F.	Means.
September 1.		22h.					
179° 59′	64″2	63″9	77″1	65″9	54″1	47″0	62″03
	64.0	64.6	77.6	66.1	55.2	46.9	62.40
	64.0	64.9	77.6	66.0	55.2	46.8	62.42
C.	64.1	64.9	77.1	66.1	55.8	46.9	62.48
	63.4	64.6	77.8	65.8	55.1	46.6	62.22
	64.0	65.0	77.5	65.6	55.9	46.9	62.48
Means	63.95	64.65	77.45	65.92	55.22	46.85	62.339 —.135
September 2.		20h.					
179 59	66.6	62.4	77.6	63.8	54.3	47.8	62.05
	65.6	63.5	78.8	63.4	56.4	46.3	62.33
	67.7	63.0	78.8	65.5	55.2	49.0	63.20
P.	66.3	63.5	79.0	64.0	57.0	46.0	62.62
	67.0	62.7	78.4	64.7	54.7	47.6	62.52
	66.0	64.0	79.0	63.7	57.0	46.0	62.62
Means	66.53	63.15	78.60	64.18	55.77	47.12	62.558 —.134
September 7.		13h.,	30m.				
179 59	63.1	63.3	79.1	64.5	52.1	49.9	62.83
	67.1	63.1	79.4	63.3	52.9	58.2	62.33
C.	67.5	63.0	79.0	64.0	52.9	48.6	62.50
	67.1	63.0	79.0	63.9	52.9	48.2	62.35
Means	67.45	63.10	79.12	63.93	52.70	48.72	62.504 —.137
September 7.		23h.					
179 59	64.6	65.1	80.6	65.1	55.0	45·2	62.60
	65.3	64.9	80.1	66.1	52.9	47.1	62.73
	65.2	65.7	80.5	66.0	54.1	46.8	63.05
C.	65.1	65.1	80.5	65.9	53.9	46.2	62.78
	64.9	65.9	80.7	65.5	55.0	46.1	63.02
	64.6	64.9	80.5	66.2	53.4	47.1	62.78
Means	64.95	65.27	80.48	65.80	54.05	46.42	62.828 —.134
September 8.		19h.					
179 59	68.4	62.3	81.0	64.8	52.7	48.0	62.87
	66.6	63.2	82.2	64.2	54.6	45.8	62.77
	67.6	61.8	80.4	64.6	52.4	47.8	62.43
P.	67.2	63.5	81.7	64.2	55.5	46.2	63.05
	67.8	62.8	81.7	65.6	53.5	48.2	63.27
	66.8	63.6	61.7	64.3	55.4	46.2	63.00
Means	67.40	62.87	81.45	64.62	54.02	47.03	62.898 —.138

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
1, No. 1	78.8	77.2	77.0
		79.0	77.8
2, " 1	79.0	81.3	80.5
7, " 1	83.0	88.0	84.7
" 2	83.0	76.8	78.8
		79.5	80.0
8, " 1	80.5	82.5	81.5

17 to 23. Through thin clouds.
24 to 32. Zenith Point doubtful: coincidence used, the mean for Sept. 1 & 7.
26. Mean reading = $\frac{1}{4}$ (A + B) + $\frac{1}{6}$ (B + C + F) —1″.63.
25, 34. Cor. of N. L. for defective illumination, —0″.11.
36. Cor. of N. L. for defective illumination, —0″.28.
50 to 52. High wind.
Nadir Points, Sept. 1 & 7. Apparent error of collimation, 8″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMETE At.	Ext.	St.	Up.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
September 8	†1	β Aquilæ	4	. . .	32 50 73.2	69.2	85.3	72.4	60.3	53.2	68.93	. .	29.908	81.2	78.0		81.5
	2	α¹ Capricorni, (Mic.) . .	6	. . .	"	"	"	"	"	"	"	32.194	29.900	81.0	78.0		80.5
	3	α² Capricorni	4	. . .	51 52 79.8	76.0	91.7	80.7	66.3	59.8	75.72	. .					
	4	61¹ Cygni	4	. . .	0 53 30.5	27.7	45.0	31.0	18.6	11.7	27.42	. .	29.912	80.3	76.3		81.5
	5	ζ Cygni	4	. . .	9 16 75.6	71.5	88.6	76.0	63.8	53.7	71.53	. .					
	†6	α Cephei	4	. . .	336 57 36.3	31.4	42.2	34.5	22.8	16.2	30.57*d*	. .	29.914	80.0	76.0		80.5
	7	β Cephei	4	. . .	329 0 42.5	39.5	59.3	42.0	28.6	24.0	39.32	. .	29.914	80.0	76.0		80.5
	8	ε Pegasi	4	. . .	29 42 30.0	25.4	42.8	29.4	16.8	9.7	25.69*d*	. .	29.914	79.7	76.0		
	†9	Saturn, S. L.	4	. . .	53 14 24.0	20.2	36.6	23.2	10.4	3.2	19.60	. .	29.916	79.3	76.5		79.0
	10	Saturn, N. L., (Mic.) .	4	. . .	"	"	"	"	"	"	"	30.320					
	†11	α Piscis Australis . . .	4	. . .	69 16 69.0	67.2	84.3	69.8	58.6	49.6	66.42*d*	. .	29.910	78.9	75.8	80.5	78.5
9	12	α Cygni	4	. . .	354 9 20.6	21.1	37.8	23.1	12.8	2.5	19.65	. .	30.238	71.5	64.7	78.0	70.6
	†13	ζ Pegasi	4	. . .	28 50 55.6	59.6	73.3	63.1	47.1	38.9	56.27	. .	20.268	69.1	62.6	77.5	67.3
	14	α Piscis Australis . . .	4	. . .	69 16 55.4	61.9	75.1	64.0	48.2	40.1	57.45	. .	30.268		62.0		66.4
	15	α Pegasi	4	. . .	24 29 67.9	70.8	84.2	73.8	58.2	49.0	67.32	. .	30.270	69.0	62.0		66.0
	16	γ Cephei	4	. . .	322 7 44.4	47.0	62.6	50.4	33.6	28.0	44.33*d*	. .	30.278	69.0	61.5	77.2	72.2
13	17	α Lyræ	4	. . .	0 14 41.3	38.8	55.3	42.2	28.0	23.4	38.17	. .	30.032	79.1	77.4	75.0	79.7
	18		3	— 9 53.0	310 24 67.7	64.6	82.4	66.6	57.0	47.7	64.33	29.813	30.010	75.3	71.5	75.5	76.5
	19			7 53.0								.787					
	20			5 53.0								.753					
	21			3 53.0								.740					
	22	Polaris, (Mic.) . . .		1 53.0								.732					
	23		4	— 0 12.0								.726					
	24			+ 1 48.0								.726					
	25			5 48.0								.760					
	26			7 48.0								.784					
	27		5	9 34.0	67.2	64.8	81.4	66.6	57.3	47.0	64.05	.805	30.006	75.1	71.5		76.0
14	28	α Lyræ	4	. . .	0 14 40.1	37.2	53.1	40.8	27.9	21.4	36.75	. .			80.0		83.0
	29	γ Cephei	4†	+ 0 14.0	322 7 43.2	39.7	58.8	43.5	30.0	25.0	40.03*d*	. .	29.900	78.0	74.0	78.0	77.6
	30	α Andromedæ	4	. . .	10 38 44.1	42.8	58.7	46.3	31.9	27.0	41.80	. .			73.6		77.8
	31	γ Pegasi	4	. . .	24 32 77.2	75.0	90.1	76.0	65.9	55.9	73.35	. .	29.892	77.8	73.4		77.7
	32		3	— 9 45.6	310 24 78.2	76.7	93.9	78.9	68.6	59.9	76.03	. .	29.870	77.5	73.6	78.0	78.5
	33	(Mic.)		6 55.6								29.953					
	34	(Mic.)		6 25.6								.962					
	35	(Mic.)		5 55.6								.946					
	36	(Mic.)		5 25.6								.939					
	37	(Mic.)		5 5.6								.940					
	38			3 45.6	25 22.9	21.0	38.9	23.9	12.9	4.0	20.60	. .					
	39	Polaris . . .	4	— 0 10.6	24.1	22.1	40.0	25.1	13.5	5.0	21.63	. .			73.3		78.5
	40			+ 3 44.4	22.1	20.6	37.9	22.9	11.6	3.6	19.78	. .					
	41	(Mic.)		6 24.4								30.019					
	42	(Mic.)		6 54.4								.024					
	43	(Mic.)		7 24.4								.029					
	44	(Mic.)		7 54.4								.042					
	45	(Mic.)		8 24.4								.042					
	46		5†	+10 2.4	24 78.1	73.6	92.4	78.1	67.4	59.6	74.87	. .	29.864	77.5	73.4		78.2
15	47	Sun, N. L., (Mic.) . .	1	— 0 45.8	35 34 66.5	62.6	77.6	65.3	53.5	46.3	61.97	28.070	29.854	82.2	88.5	78.0	85.0
	†48		4	. . .	"	"	"	"	"	"	"	.072					
	49		3	—10 0.0	310 24 65.0	67.7	83.8	67.7	58.4	44.8	64.57	29.791	30.124	66.3	56.4	77.0	
	50			8 0.0								.767					
	51			6 0.0								.755					
	52	Polaris, (Mic.) . . .		4 0.0								.736					

DATE.	MICROMETER. Coincid.	Val. 1 *r*.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Sept. 3, 22*h*.	30.014	62.75	Saturn .	9	0 9.54
" 9, 20*h*.	30.011				
" 13, 0*h*.	30.004				
" 14, 0*h*.	30.008				
" 15, 12*h*.	29.996				

Sept. 4. Error of Runs —0″.24. Temp. of circle 72° ; of stone 78°
Sept. 13.
Sept. 14. do. +0″.14 do. 75° do. 75°
Sept. 15.
Sept. 13, 20*h*. Removed several small particles or fibres, which connected the micrometer and fixed wires.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
nstrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.06	+ 0 35.48	32 51 44.35	62.76	+ 6 1 57.66	+10.86	P.
-2 16.72	1 9.82	51 52 8.82		— 12 58 26.81	22.30	
-0 0.14	1 9.91	51 54 25.77		— 13 0 43.76	22.43	
-0 0.11	0 0.86	0 53 28.39		+ 38 0 13.62	37.74	
-0 0.10	+ 0 9.01	9 17 20.42		+ 29 36 21.59	28.93	
-0 0.06	— 0 23.47	336 57 7.16		+ 61 56 34.85	31.13	
-0 0.03	— 0 33.14	329 0 6.15		+ 69 53 35.86	34.65	
-0 0.06	+ 0 31.48	29 42 57.23		+ 9 10 44.78	37.64	
-0 0.03	1 12.89	53 15 22.98		— 14 21 40.97		
-0 19.03	1 12.88					
-0 0.06	2 24.71	69 19 31.19		— 30 25 49.18	50.56	
0.04	— 0 5.84	354 9 13.85	61.59	+ 44 44 26.99	20.09	C.
0.09	+ 0 31.58	28 51 27.94		+ 10 2 12.90	47.36	
0.20	2 30.53	69 19 28.18		— 30 25 47.34	50.68	
0.01	+ 0 26.16	24 30 33.49		+ 14 23 7.35	50.47	
-0 0.07	— 0 44.67	322 6 59.73		+ 76 46 41.11	+62.51	
-0 0.06	+ 0 0.23	0 14 38.34	61.57	+ 38 39 2.48	—15.34	P.
-0 16.96	— 1 5.47	310 24 15.68	61.35	+ 88 29 24.63	+70.30	
16.77	.47	15.49				
17.51	.47	16.23				
17.33	.47	16.05				
17.26	.47	15.98				
17.48	.47	16.20				
17.67	.47	16.39				
17.13	.46	15.86				
17.04	.46	15.77				
-0 17.30	— 1 5.46	16.03				
-0 0.03	+ 0 0.24	0 14 36.96	61.30	+ 38 39 3.59	—15.41	C.
-0 0.08	— 0 43.04	322 6 57.07		+ 76 46 43.48	+60.50	
0.07	+ 0 10.41	10 38 52.28		+ 28 14 48.27	56.29	
0.09	+ 0 25.31	24 33 38.75		+ 14 20 1.80	55.62	
4.91	— 1 4.89	310 24 16.05		+ 88 29 24.32	+69.82	
5.82	.88	16.97				
4.92	.88	16.07				
5.61	.88	16.76				
5.74	.88	16.89				
5.50	.88	16.65				
-0 0.70	.87	16.43				
-0 0.03	.86	16.74				
-0 0.69	.87	15.60				
1.47	.87	16.38				
1.50	.87	16.41				
1.55	.87	16.46				
1.14	.87	16.05				
1.56	.87	16.47				
-0 5.19	— 1 4.88	15.18				
2 1.43	+16 29.77	35 53 32.83	62.20	+ 3 0 8.62		P.
2 0.75						
-0 17.89	— 1 7.71	310 24 14.67				
17.57	.72	14.34				
16.90	.73	13.66				
17.08	.74	13.83				

NADIR POINTS—READINGS.							
	A.	B.	C.	D.	E.	F.	Means.
September 9.		23*h*.,	20*m*.				
179° 59′	60″9	66″1	78″6	67″0	52″0	44″8	61″57
	61.1	66.1	78.9	67.9	52.4	44.1	61.75
	61.0	65.8	78.1	67.0	51.8	44.1	61.30
C.	60.9	66.9	79.0	67.0	53.9	43.4	61.85
	61.2	66.9	78.6	67.9	53.0	44.1	61.95
	60.7	66.9	79.0	67.1	54.1	43.6	61.90
Means	60.97	66.45	78.70	67.32	52.87	44.02	61.720 —.131
September 13.		18*h*.,	40*m*.				
179 59	67.0	61.3	79.5	64.0	52.2	47.3	61.88
	65.5	62.3	79.8	62.7	55.2	44.7	61.70
P.	66.6	61.2	78.8	64.0	52.0	46.3	61.48
	65.2	62.8	79.6	63.0	55.3	44.7	61.77
Means	66.07	61.90	79.43	63.42	53.68	45.75	61.708 —.134
September 13.		0*h*.					
179 59	63.4	63.3	77.7	64.7	53.0	44.4	61.08
	63.4	64.3	78.5	64.4	55.2	43.6	61.57
P.	64.7	63.7	78.0	65.6	53.2	45.5	61.78
	62.7	64.3	78.6	64.4	55.6	43.3	61.48
Means	63.55	63.90	78.20	64.77	54.25	44.20	61.479 —.133
September 14.		0*h*.,	40*m*.				
179 59	65.0	63.0	77.1	65.5	51.6	47.0	61.53
	64.9	63.1	77.9	64.9	51.9	46.0	61.45
	64.4	63.0	77.9	64.9	52.1	45.9	61.37
C.	64.2	63.1	78.0	65.0	52.1	46.0	61.40
	64.4	63.1	77.9	65.1	52.6	46.1	61.53
	64.0	63.1	78.0	65.0	52.1	46.1	61.38
Means	64.48	63.07	77.80	65.07	52.07	46.18	61.444 —.134
September 15.		12*h*.					
179 59	67.5	61.3	78.0	63.8	52.6	48.7	61.98
	67.0	62.8	79.4	63.8	54.0	47.5	62.42
P.	68.0	61.7	78.5	63.8	52.6	49.2	62.30
	67.0	62.6	79.3	64.3	54.3	48.3	62.63
Means	67.37	62.10	78.80	63.93	53.38	48.42	62.333 —.137
September 15.		19*h*.					
179 59	67.6	61.3	80.0	64.0	51.2	48.2	62.05
	66.7	61.6	80.5	63.4	53.3	46.4	61.98
P.	67.3	61.3	80.0	63.4	51.5	47.5	61.83
	66.5	62.0	80.0	63.4	52.2	47.0	61.85
Means	67.03	61.55	80.12	63.55	52.05	47.27	61.929 —.135

THERMOMETERS.

IR POINTS.		Stone.	Upper.	Lower.
		°	°	°
9,	No. 1	77.2	66.7	69.4
			71.0	72.0
13,	" 1	75.0	80.5	77.5
	" 2	75.5	76.5	75.5
14,	" 1	78.0	78.0	77.2
			78.7	77.5
15,	" 1	78.0	86.5	81.5
	" 2	78.0	79.7	77.5

1 to 11. High wind.
6. C erroneously noted 32″.2.
9. Sidereal time of S. diam. passing, 0*s*.99, (6 wires.)
11. Unsteady, diffused.
13. A erroneously noted 65″.6.
48. Partially obscured: interrupted by clouds.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMETE At.	Ext.	St.	Up.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
September 15	1	Polaris, (Mic.) . . .	4	— 2 0.0								29.718					
	2			— 0 13.0								.711					
	3			+ 1 47.0								.722					
	4			3 47.0								.732					
	5			5 47.0								.747					
	6			7 47.0								.761					
	7		5	— 9 32.0	310 24 64.7	67.7	83.0	68.3	57.6	45.2	64.42	.786	30.114	66.0	55.5		67.5
	8	α Leonis, (Mic.) . . .	4	. . .	26 11 64.7	68.0	79.2	70.4	53.7	44.5	63.42*d*	31.611	30.228	67.0	65.9		
	9	Venus, S. L.	4	. . .	26 39 34.0	38.2	50.6	42.0	22.2	15.1	33.68	. .	30.230	67.4	67.6	73.0	71.2
	†10	Venus, N. L. (Mic.) . .	4	. . .	“	“	“	“	“	“	“	30.189					
16	†11	Sun, N. L. (Mic.) . .	3	— 0 14.5	35 59 67.5	68.8	82.2	72.6	56.6	46.0	65.62	29.908	30.204	69.5	69.0	73.0	72.5
	†12	Sun, S L.	5	+ 0 16.5	36 31 70.2	70.8	84.2	74.1	59.7	49.4	68.07*d*	. .					
	†13	Polaris, S. P., (Mic.) .	5	— 9 41.5								30.608	30.180	71.0	71.3		
	14		4	7 41.5								.647					
	15			5 41.5								.684					
	16			3 41.5								.684					
	17			— 1 41.5								.703					
	18			+ 0 6.5								.690					
	19			2 6.5								.690					
	20			4 6.5								.689					
	21			6 6.5								.669					
	22			8 6.5								.646					
	†23		3	+ 9 44.5	307 24 67.2	66.0	82.0	70.8	56.2	48.2	65.07	.619	30.171	71.4	71.2		74.
	†24	Polaris . .	3	— 9 54.0	310 24 77.1	81.2	95.0	84.8	68.8	59.1	77.67	. .	30.098	58.5	53.8	70.8	60.
	25	(Mic.)	4	7 18.0								29.928					
	26	(Mic.)		6 48.0								.961					
	27	(Mic.)		6 18.0								.949					
	28	(Mic.)		5 48.0								.946					
	29	(Mic.)		5 18.0								.916					
	30			3 40.0	25 22.0	27.9	40.8	31.1	14.8	4.0	23.43	. .					
	31			— 0 12.0	21.9	27.4	40.2	31.1	14.1	4.7	23.23	. .			51.4		60.
	32			+ 3 49.0	21.9	28.0	40.1	31.1	14.1	4.9	23.35	. .					
	33	(Mic.)		6 2.0								30.032					
	34	(Mic.)		6 32.0								.029					
	35	(Mic.)		7 2.0								.048					
	36	(Mic.)		7 32.0								.049					
	37	(Mic)		8 2.0								.051					
	†38		5	+10 6.0	17.6	23.0	35.0	27.0	9.1	0.2	18.70	. .	30.092	58.2	52.4		61.
19	†39	Polaris, S. P., (Mic.) . .	5	— 9 42.3	307 24 61.0	59.2	74.8	61.2	47.6	42.0	57.63	30.517	30.186	72.0	72.6	70.5	
	40			7 42.3								.557					
	41			5 42.3								.571					
	42			3 42.3								.597					
	43			— 1 42.3								.602					
	44			+ 2 2.7								.603					
	45			4 2.7								.587					
	46			6 2.7								.564					
	47			8 2.7								.545					
	†48		3	+ 9 45.7								.508	30.182	72.2	72.5		73.
21	49	Sun, N. L. . . (Mic.)	1½	— 0 38.5	”	”	”	”	”	”	”	30.022			79.0		76.
	50		3½	— 0 7.0	37 56 39.6	39.9	52.6	43.2	25.3	20.1	36.79*d*	. .					
	51	Sun, S. L., (Mic.) . .	5†	+ 0 18.5	38 28 30.7	31.0	44.6	34.6	18.4	10.1	28.23*d*	29.904	30.126	73.1	79.3	69.0	75.
	52		6†	0 33.5	“	“	“	“	“	“	“	.921					

DATE.	MICROMETER. Coincid.	Val. 1 *r*.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Sept. 15,		62.75	Venus .	9	0 5.94
“ 16, 12*h*.	30.000		Sun . .	11	15 58.51
0*h*.	30.012				
“ 21, 12*h*.	30.000		Sun . .	49	15 57.54

Sept. 16. Sept. 19.	Error of Runs	+0″.14.	Temp. of circle	75°;	of stone	75°
Sept. 21.	do.	.51	do.	75°	do.	69°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
Instrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
+0 17.60	—1 7.75	310 24 14.34				P.
17.86	.76	14.59	61.79	+ 88 29 26.79	+69.45	
17.35	.77	14.07				
17.31	.78	14.02				
17.37	.79	14.07				
17.89	.80	14.58				
17.91	—1 7.81	14.59				
—1 41.09	+0 28.00	26 10 50.33	61.71	+ 12 42 50.63	—56.58	C.
0.00	0 25.98	26 39 53.72		+ 12 13 47.24		
—0 11.75	0 25.86					
+0 5.93	0 36.05	36 16 46.11		+ 2 36 54.85		P.
—0 0.24	+0 36.79					
42.87	—1 13.36	307 23 8.84				
43.56	.36	8.15				
44.53	.36	7.18				
43.59	.36	8.12				
44.26	.36	7.45				
43.31	.36	8.40		+ 88 29 26.98	+69.27	
43.55	.36	8.16				
44.13	.36	7.58				
43.94	.36	7.77				
43.97	.36	7.74				
-0 43.79	1 13.36	7.92				
-0 5.09	1 8.02	310 24 14.74				C.
7.97	.12	17.52				
5.54	.14	15.07				
5.96	.16	15.47				
5.83	.18	15.32				
7.44	.20	16.91				
0.72	.24	15.91				
0.03	.31	14.95	60.54	+ 88 29 24.10	69.09	
0.78	.30	15.83				
0.74	.28	15.81				
1.26	.27	16.34				
0.42	.26	15.51				
0.73	.24	15.84				
1.01	.23	16.13				
+0 5.29	1 8.18	15.81				
—0 36.93	1 13.18	307 23 7.52				P.
37.67	.18	6.78				
37.19	.18	7.26				
37.87	.18	6.58				
37.65	.18	6.80	61.43	+ 88 29 26.42	+68.24	
37.81	.19	6.63				
37.43	.19	7.01				
37.04	.19	7.40				
37.31	.19	7.13				
36.57	—1 13.19	7.87				
—0 0.70	+0 39.85					
+0 0.27						
5.71	+0 38.63	38 13 13.96	61.42	+ 0 40 26.71		C.
4.56						

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
September 16.		12*h*.					
179° 59′	63″3	64″5	78″8	67″2	51″8	45″2	61″80
	62.8	65.2	79.9	66.2	53.8	44.0	61.98
	63.4	64.5	78.5	67.7	51.6	45.2	61.82
P.	62.5	65.5	79.9	66.5	54.2	43.4	62.00
	63.4	65.0	78.9	67.6	52.0	45.3	62.03
	62.3	65.0	79.0	66.4	52.6	43.4	61.45
Means	62.95	64.95	79.17	66.93	52.67	44.42	61.847 —.134
September 16.		0*h*.					
179 59	59.4	66.4	77.1	69.8	51.1	41.6	60.90
	58.9	66.2	76.9	69.1	51.0	41.6	60.62
	59.1	66.6	77.1	68.9	51.3	41.9	60.82
C.	58.2	66.1	76.9	68.9	50.9	41.1	60.35
	59.1	67.0	76.9	69.0	50.9	41.9	60.80
	59.0	66.1	76.9	69.0	51.0	41.1	60.52
Means	58.95	66.40	76.97	69.12	51.03	41.53	60.667 —.133
September 19.		13*h*.,	30*m*.				
179 59	64.8	63.5	78.7	65.3	51.2	46.0	61.58
	63.7	63.8	79.0	64.4	53.2	44.0	61.35
P.	64.7	63.5	78.5	65.8	51.3	45.4	61.53
	63.7	64.6	79.3	65.0	53.5	44.7	61.80
Means	64.22	63.85	78.88	65.12	52.30	45.03	61.567 —.134
September 19.		19*h*.					
179 59	64.6	63.0	77.3	65.6	49.6	44.8	60.82
	63.8	64.0	77.6	65.0	51.5	43.0	60.82
P.	65.0	63.6	77.8	66.5	50.6	45.5	61.50
	63.6	64.0	78.0	65.8	51.4	44.4	61.20
Means	64.25	63.65	77.67	65.73	50.78	44.42	61.083 —.133
September 21.		12*h*.,	30*m*.				
179 59	65.4	64.1	78.0	66.4	50.5	45.1	61.58
	64.7	64.1	78.0	66.2	51.0	45.0	61.50
	65.0	64.2	77.7	66.8	51.1	44.7	61.58
C.	64.7	64.9	78.1	66.1	51.0	44.8	61.60
	64.9	64.9	78.6	65.9	51.1	44.7	61.68
	64.0	64.7	78.0	65.9	51.6	44.2	61.40
Means	64.78	64.48	78.07	66.22	51.05	44.75	61.558 —.138

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
16, No. 1	73.0	74.0	72.3
" 2	70.8	61.0	62.8
		62.9	63.5
19, " 1	70.5	74.5	72.3
" 2	71.0	72.5	71.5
21, " 1	69.0	77.5	73.0
		77.8	73.0

10. Cor. of N. L. for defective illumination, —0″.12.
11, 12. Very unsteady : limbs poorly defined.
13 to 23. Very unsteady and faint.
24 to 38. Very unsteady.
39 to 48. Very faint.
Nadir Point, Sept. 19, No. 2 used only for Zones.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.									Barometer.	THERMOMETE			
						A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up
			No.	M. S.	° ′	″	″	″	″	″	″	″	*Revs.*	*In.*	°	°	°	
September 21	1	Sun, S. L., (Mic.) . .	7	+ 0 48.5		"	"	"	"	"	"	"	29.930					
	†2	Mercury	4	. . .	32 1	63.3	62.6	77.4	65.0	50.6	42.0	60.15	. .	30.240	67.8	67.4	69.5	70
22	†3	Sun, S. L., (Mic.) . .	3½	− 0 8.5	38 52	30.1	31.0	45.8	34.4	18.4	11.3	28.51*d*	30.501	30.240	68.8	68.5		70
	†4	Sun, N. L.	5†	+ 0 19.5	38 19	60.8	59.6	75.5	63.0	47.8	41.3	58.00	. .					
	†5	Mercury, S. L. . . .	4	. . .	32 42	50.8	52.6	66.1	53.6	38.0	30.8	48.65*d*	. .	30.228	68.5	71.7	69.5	7
	†6	Mercury, N. L. (Mic.) .	4	. . .		"	"	"	"	"	"	"	30.115					
23	7	Sun, S. L.	4	. . .	39 15	22.8	22.3	36.5	25.3	11.3	2.2	20.07	. .	30.216	70.0	72.5		7
	8	α Andromedæ	4	. . .	10 38	41.2	43.1	56.0	47.9	28.3	23.1	39.93	. .	30.140	67.5	61.9	69.0	6
	9	γ Pegasi	5	. . .	24 32	73.6	74.9	87.1	77.1	62.6	52.1	71.23	. .			61.9		6
	†10		3	− 9 50.2	310 24	75.8	76.8	89.9	81.6	65.1	57.5	74.45	. .	30.138	67.4	60.9	69.0	6
	11	(Mic.)		7 13.2									29.951					
	12	(Mic.)		6 53.2									.951					
	13	(Mic.)		6 23.2									.956					
	14	(Mic.)		5 53.2									.952					
	15	(Mic.)		5 23.2									.942					
	16			3 13.2		79.6	81.0	94.1	85.0	68.9	61.6	78.37	. .					
	17	Polaris . . .	4	− 0 7.2		81.6	83.1	96.5	87.0	70.9	63.4	80.42	. .			60.7		67
	18			+ 3 33.8		79.8	81.1	94.8	85.9	68.9	61.4	78.65	. .					
	19	(Mic.)		5 36.8									30.025					
	20	(Mic.)		6 6.8									.022					
	21	(Mic.)		6 36.8									.029					
	22	(Mic.)		7 6.8									.029					
	23	(Mic.)		7 36.8									.028					
	†24		5	+ 9 41.8		77.1	78.9	92.1	83.0	66.1	58.5	75.95	. .	30.138	67.4	60.6		66.
	†25	Mercury	4	. . .	33 24	50.8	53.2	64.7	54.6	38.0	32.0	48.88	. .	30.106	70.0	75.0	68.0	73.
24	†26		5	− 9 42.8	307 24	69.5	68.0	84.0	70.0	59.4	50.3	66.87	30.643					
	27			7 42.8									.675					
	28			5 42.8									.695					
	29			3 42.9									.705					
	30			− 1 42.8									.715					
	31	Polaris, S. P., (Mic.) .	4	+ 0 2.2									.720	30.109	72.8	78.5		76.
	32			2 2.2									.705					
	†33			4 2.2									.696					
	34			6 2.2									.683					
	35			8 2.2									.667					
	36		3	+ 9 49.2									.641	30.107	74.0	79.0		77.
	37		3	− 9 50.0	310 24	60.5	58.4	75.0	60.0	47.5	59.2	56.77	29.759	30.096	70.2	66.0	70.0	70.
	38			7 50.0									.718					
	39			5 50.0									.693					
	40			3 50.0									.680					
	41			1 50.0									.680					
	42	Polaris, (Mic.) . . .	4	− 0 9.0									.677					
	43			+ 1 51.0									.677					
	44			3 51.0									.687					
	45			5 51.0									.705					
	46			7 51.0									.716					
	†47		5	+ 9 41.0		59.8	58.6	74.6	60.6	47.3	39.2	56.68	.735	30.096	70.2	66.0		
	48	Venus, S. L.	4	. . .	30 32	66.1	66.6	79.5	66.7	55.0	46.5	63.40*d*	. .	30.070	71.0	76.4	69.5	74.
	†49	Venus, N. L. (Mic.) . .	4	. . .		"	"	"	"	"	"	"	30.181					
	50	Mercury, S. L. . . .	4	. . .	34 7	68.6	69.5	82.1	70.3	57.0	47.1	65.77	. .	30.058	73.0	78.4		76.
	†51	Mercury, N. L. (Mic.) .	4	. . .		"	"	"	"	"	"	"	30.091					
25	52	Sun, N. L. (Mic.) . .	1	− 0 44.4	40 1	74.1	75.6	87.1	76.3	64.0	54.3	71.90*d*	30.030	30.044	74.9	79.3		77.

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Sept. 22, 12*h*.	30.006	62.75	Sun . .	3	16 0.44
11*h*.	30.005		Mercury	5	0 3.47
" 23, 13*h*.	30.008				
" 24,			Venus .	48	0 5.49
			Mercury	50	0 2.79

Sept. 22.
Sept. 23. } Error of Runs —0″.05. Temp. of circle 70°; of stone 70°
Sept. 24.
Sept. 25. do. .43 do. 74° do. 70°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 3.65						C.
0.02	+ 0 31.81	32 2 31.99	61.13	+ 6 51 8.39		P.
30.81	0 40.27	38 36 37.53		+ 0 17 2.85		
0.38	0 39.48					
0.05	0 32.43	32 43 17.65	61.05	+ 6 10 22.65		
6.78	+ 0 32.31					
0.01	—15 17.85	39 0 2.21		— 0 6 21.51		
0.02	+ 0 10.75	10 38 50.70	60.19	+ 28 14 48.74	+54.56	C.
0.04	+ 0 26.12	24 33 37.39		+ 14 20 2.05	54.49	
5.00	— 1 7.16	310 24 12.29		+ 88 29 26.66	66.77	
6.19	.17	13.47				
5.95	.17	13.23				
5.30	.17	12.58				
5.23	.17	12.51				
5.57	.17	12.85				
0.54	.18	11.73				
0.00	.18	13.24				
0.65	.18	12.12				
0.64	.19	12.10				
1.13	.19	12.59				
1.02	.19	12.48				
1.38	.19	12.84				
1.82	.19	13.28				
4.87	— 1 7.20	13.62				
+0 0.01	+ 0 33.06	33 25 21.95	61.20	+ 5 28 18.50		P.
—0 44.66	— 1 12.20	307 23 10.01		+ 88 29 29.68	66.59	
44.90	.20	9.77				
44.79	.20	9.88				
44.47	.20	10.20				
44.56	.20	10.11				
44.74	.19	9.94				
44.02	.18	10.67				
44.10	.17	10.60				
44.33	.16	10.38				
44.79	.15	9.93				
—0 44.80	1 12.14	9.93				
+0 20.46	1 6.39	310 24 10.80	61.39	+ 88 29 29.21	+66.41	
21.25	.39	11.59				
21.43	.39	11.77				
21.26	.39	11.60				
20.70	.38	11.05				
20.74	.38	11.09				
20.93	.38	11.28				
20.90	.39	11.24				
20.79	.39	11.13				
21.52	.39	11.86				
21.99	— 1 6.39	12.33				
+0 0.02	+ 0 29.98	30 33 27.91	61.42	+ 8 20 12.26		C.
—0 10.85	+ 0 29.87					
+0 0.10	+ 0 33.70	34 8 36.78		+ 4 45 3.89		
—0 5.41	+ 0 33.63					
—0 0.80						

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
September 22.		12*h*.,	20*m*.				
179° 59′	64″0	64″0	78″5	65″8	49″7	44″0	61″00
	63.0	65.2	79.4	64.5	52.0	43.0	61.18
	64.2	64.3	78.8	65.6	50.3	44.0	61.20
P.	63.7	65.3	79.8	65.0	52.4	42.6	61.47
	63.8	64.5	79.0	66.0	50.4	44.2	61.48
	63.5	65.2	79.6	64.6	52.2	42.4	61.25
Means	63.87	64.75	79.18	65.25	51.17	43.37	61.264 —.134
September 23.		12*h*.,	20*m*.				
179 59	65.5	63.8	78.2	65.3	51.0	45.3	61.52
	64.0	64.3	78.4	65.3	52.0	43.0	61.17
P.	65.0	63.8	77.7	65.3	50.6	44.2	61.10
	63.7	64.6	78.2	64.6	51.7	43.0	60.97
Means	64.55	64.12	78.12	65.13	51.32	43.88	61.188 —.135
September 23.		0*h*.,	20*m*.				
179 59	61.6	63.9	75.5	67.1	49.4	43.0	60.08
	61.0	64.4	76.1	67.4	49.7	43.1	60.28
	61.5	64.5	76.4	67.9	50.0	43.0	60.55
C.	61.4	64.3	76.1	68.0	50.1	43.0	60.48
	60.8	64.5	75.8	67.0	49.9	42.5	60.08
	61.1	64.9	76.0	67.6	50.1	43.0	60.45
Means	61.23	64.42	75.98	67.50	49.87	42.93	60.322 —.133
September 24.		13*h*.,	30*m*.				
179 59	65.2	63.9	77.4	64.8	51.3	44.8	61.23
	65.2	64.8	78.3	65.0	52.7	44.4	61.73
	65.4	64.0	77.0	65.7	50.3	45.0	61.23
P.	65.0	64.8	77.5	65.0	52.0	44.0	61.38
	65.0	64.3	77.0	65.0	51.0	44.8	61.18
	64.3	64.8	77.5	64.5	52.4	44.0	61.25
Means	65.02	64.43	77.45	65.00	51.62	44.50	61.336 —.135
September 24.		19*h*.					
179 59	66.0	63.0	77.8	66.2	51.3	45.0	61.55
	66.0	63.3	78.4	66.2	51.7	45.7	61.88
P.	66.2	63.0	78.4	65.6	50.7	45.2	61.52
	65.0	63.0	78.7	64.7	52.3	43.2	61.15
Means	65.80	63.07	78.33	65.67	51.50	44.78	61.525 —.134
September 25.		13*h*.,	30*m*.				
179 59	65.0	64.4	79.1	64.9	53.7	44.8	61.98
	64.2	64.0	79.0	64.7	53.0	43.9	61.47
	64.0	64.1	78.6	64.8	52.8	43.6	61.32
C.	64.0	64.3	78.9	65.0	53.0	44.0	61.53
	63.9	64.5	78.6	65.0	52.6	43.0	61.37
	64.1	64.8	78.8	65.2	53.1	44.1	61.68
Means	64.20	64.35	78.83	64.93	53.05	44.00	61.558 —.135

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
22, No. 1	69.5	71.0	70.0
23, " 1	69.5	77.7	70.0
" 2	69.0	67.5	68.3
		69.5	69.0
24, " 1		77.0	72.5
" 2	70.0	73.0	72.5
25, " 1	70.0	78.5	74.0
		77.3	73.0

2, 5, 6. Very unsteady and faint.
3, 4. Limbs poorly defined.
6. Cor. of N. L. for defective illumination, —0″.12.
10 to 24. Very unsteady.
25, 33. Faint.
26 to 47. For coincidence of micrometer used mean of Sept. 23 and 25.
49. Cor. of N. L. for defective illumination, —0″.11.
51. Cor. of N. L. for defective illumination, —0″.07.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.									Barometer.	THERMOM			
						A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	
			No.	M. S.	° ′	″	″	″	″	″	″	″	Revs.	In.	°	°	°	
September 25	1	Sun, S. L., (Mic.)	2	− 0 28.4		“	“	“	“	“	“	“	30.026					
	2		3	− 0 14.4		“	“	“	“	“	“	“	.016					
	3	Sun, N. L., (Mic.)	4†	+ 0 8.6	39 29	70.0	69.5	82.4	72.2	59.6	49.9	67.27	29.946					
	4		5†	0 21.6		“	“	“	“	“	“	“	.936					
	5		6†	0 35.6		“	“	“	“	“	“	“	.939					
	6		7	+ 0 47.6		“	“	“	“	“	“	“	.923					
	†7	Polaris, S. P.	5†	− 9 14.2	307 24	29.4	27.1	44.6	28.6	17.0	9.1	25.97	. .	30.024	76.1	80.8	70.0	
	8	(Mic.)		6 14.2									30.051					
	9	(Mic.)		5 54.2									.056					
	10	(Mic.)		5 34.2									.062					
	11	(Mic.)		5 14.2									.062					
	12	(Mic.)		4 54.2									.060					
	13			− 4 2.2		25.1	22.9	40.3	25.1	13.6	6.0	22.17	. .			80.8		
	14		4†	+ 0 37.8		23.9	21.1	38.8	23.8	11.8	3.9	20.55	. .	30.024		81.0		
	15			3 43.8		24.6	22.1	39.8	24.9	13.0	5.4	21.63	. .			80.0		
	16	(Mic.)		5 45.8									29.978					
	17	(Mic.)		6 5.8									.980					
	18	(Mic.)		6 25.8									.975					
	19	(Mic.)		6 45.8									.974					
	20	(Mic.)		7 5.8									.971					
	†21		3†	+10 45.8		29.4	28.1	44.1	30.0	18.0	9.8	26.57	. .	30.020	77.0	79.6		
	†22	γ Aquilæ	4	. . . .	28 37	76.1	71.9	87.4	79.9	67.0	56.1	73.07	. .	29.904	73.5	73.0		
	23	β Aquilæ	4	. . . .	32 50	68.1	69.1	78.7	70.0	58.0	48.9	65.47	. .	29.902	73.2	72.7	71.2	
	24	α¹ Capricorni, (Mic.)	4	. . . .	51 51	78.1	78.1	88.7	82.0	66.7	58.6	75.37*d*	31.266	29.904	73.8	72.0		
	25	α² Capricorni, (Mic.)	4	. . . .		“	“	“	“	“	“	“	29.081					
	26	61¹ Cygni	4	. . . .	0 53	23.1	22.9	36.1	26.9	12.9	4.0	20.98	. .	29.904	73.8	71.0		
	27	61² Cygni, (Mic.)	4	. . . .		“	“	“	“	“	“	“	29.948					
	28	ζ Cygni	4	. . . .	9 16	69.8	68.8	80.2	71.9	57.7	47.7	66.02*d*	. .			70.7		
	29	β Aquarii	4	. . . .	45 6	66.1	65.6	77.5	69.3	53.4	45.3	62.87*d*	. .	29.902	74.0	70.4		
	30	ε Pegasi	4	. . . .	29 42	25.0	24.0	37.4	28.8	14.2	5.0	22.40*d*	. .	29.894	73.5	69.8		
	†31	Saturn, S. L.	4	. . . .	53 34	57.6	57.6	68.9	60.1	43.4	37.3	54.15	. .	29.890	72.2	69.3	71.3	
	32	Saturn, N. L., (Mic.)	4	. . . .		“	“	“	“	“	“	“	30.298					
	33	α Piscis Australis	4	. . . .	69 16	66.7	66.7	79.3	71.3	55.9	47.7	64.60*d*	. .	29.880	73.0	69.2		
	34	α Pegasi	4	. . . .	24 29	70.9	68.9	82.0	72.8	58.1	48.1	66.80	. .	29.876	73.0	69.0		
	35	γ Cephei	4½	+ 0 33.6	322 7	39.3	37.5	53.4	41.5	25.8	20.2	36.28*d*	. .	29.866	73.0	68.5		
	36	α Andromedæ	4	. . . .	10 38	41.7	42.4	55.6	46.2	29.6	23.9	39.90	. .	29.864	72.8	68.4		
	†37	Weisse O, 368	4	. . . .	40 2	56.0	56.8	67.5	59.0	42.2	37.0	53.08*d*	. .	29.854	72.2	68.4		
	38	Weisse O, 479	4	. . . .	40 13	39.1	40.0	51.9	43.0	25.6	20.8	36.73	. .			68.4		
	†39	Ceti, 163, (Mic.)	4	. . . .		“	“	“	“	“	“	“	30.072					
	†40	Weisse O, 712, (Mic.)	4	. . . .		“	“	“	“	“	“	“	31.306	29.844	72.0	68.3		
	†41	Uranus	4	. . . .	34 32	47.4	47.7	60.4	50.7	32.5	27.8	44.42*d*	. .					
	42	Polaris	3	− 9 50.5	310 24	73.7	72.4	88.1	75.4	63.2	54.5	71.22	. .	29.836	72.0	68.3	71.5	
	43	(Mic.)		7 14.5									29.971					
	44	(Mic.)		6 54.5									.960					
	45	(Mic.)		6 34.5									.948					
	46			4 6.5		77.5	76.9	91.8	79.9	67.4	58.1	75.27	. .			68.4		
	47		4	− 0 6.5		78.5	77.2	92.4	80.9	67.5	59.1	75.93	. .					
	†48			+ 9 35.5		74.7	74.0	88.0	75.8	63.9	55.6	72.00	. .	29.838	72.0	68.5		
28	49	Sun, S. L., (Mic.)	5	+ 0 18.4	41 12	25.6	28.1	41.3	31.9	12.9	8.4	24.70*d*	. .	30.226	65.0	65.3	68.5	
	50	Polaris, S. P., (Mic.)	5	− 9 36.2	307 24	61.5	61.0	79.0	63.0	49.0	42.2	59.28	30.474	30.216	65.2	66.8		
	51			7 36.2									.520					
	52			5 36.2									.535					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1*r*.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Sept. 25, 13*h*.	30.006	62.75	Sun. . .	1	16 0.42
			Saturn .	31	0 9.23
“ 28, 13*h*.	30.006				

Sept. 28. Error of Runs —0″.03. Temp. of circle 65°; of stone 65°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.77	+ 0 40.79	39 46 51.62	61.42	— 0 53 10.95		C.
-0 0.36						
-0 3.61	+ 0 39.99					
4.04						
3.65						
-0 4.47						
-0 4.35	— 1 11.68	307 23 9.94		+ 88 29 28.67	+66.23	
4.70	.68	9.59				
4.80	.68	9.49				
4.98	.68	9.31				
4.79	.68	9.50				
4.50	.68	9.79				
-0 0.78	.68	9.71				
-0 0.04	.65	8.94				
-0 0.66	.78	9.19				
-0 0.01	.80	9.84				
-0 0.31	.80	9.52				
0.22	.80	9.61				
0.38	.80	9.45				
0.44	.80	9.39				
-0 5.91	— 1 11.82	8.82				
-0 0.15	+ 0 30.30	28 38 43.52	61.15	+ 10 14 56.88	8.12	
-0 0.05	0 35.85	32 51 41.27		+ 6 1 59.13	10.05	
-1 18.91	1 10.66	51 52 7.12	60.87	— 12 58 27.00	22.56	
-0 58.11	1 10.75	51 54 24.23		— 13 0 44.11	22.70	
0.15	0 0.86	0 53 21.99		+ 38 0 18.13	34.24	
3.76	0 0.86	0 53 25.60		+ 38 0 14.52	33.48	
0.09	0 9.11	9 17 15.22		+ 29 36 24.90	26.02	
0.09	0 55.94	45 7 58.90		— 6 14 18.78	36.82	
0.07	0 31.84	29 42 54.31		+ 9 10 45.11	36.13	
+0 0.01	1 14.81	53 35 59.74		— 14 42 19.62		
—0 18.43	1 14.79					
+0 0.08	2 26.48	69 19 31.16		— 30 25 51.04	52.75	
—0 0.01	+ 0 25.47	24 30 32.26		+ 14 23 7.86	48.40	
+0 0.18	— 0 43.46	322 6 53.00		+ 76 46 47.12	56.52	
0.10	+ 0 10.51	10 38 50.51		+ 28 14 49.61	54.08	
0.04	0 46.95	40 3 40.07		— 1 9 59.95	54.42	
+0 0.10	0 47.25	40 14 24.08		— 1 20 43.96	54.42	
—0 3.98	0 47.25	40 14 20.00		— 1 20 39.88	54.42	
—1 21.27	0 47.21	40 13 2.67		— 1 19 22.55	54.31	
+0 0.05	+ 0 38.27	34 33 22.74		+ 4 20 17.38		
5.00	— 1 5.51	310 24 10.71		+ 88 29 29.32	+66.04	
4.83	.52	10.53				
5.27	.52	10.97				
5.80	.52	11.50				
+0 0.88	.52	10.63				
—0 0.01	.53	10.39				
+0 4.75	1 5.54	11.21				
—0 0.28	15 15.47	40 57 8.95	61.64	— 2 3 28.06		P.
0 33.88	1 14.11	307 23 11.33				
35.04	.12	10.16				
34.63	.12	10.57				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
September 25.		22h.					
179° 59′	63″9	63″8	76″0	67″2	50″2	44″9	61″00
	63.9	63.9	76.1	67.2	51.1	44.9	61.18
	63.5	63.9	76.2	67.0	50.5	45.0	61.02
C.	63.2	64.1	76.2	66.9	52.0	43.8	61.03
	63.0	64.1	76.0	67.0	51.2	43.8	60.85
	63.1	64.0	76.1	67.0	51.5	44.0	60.95
Means	63.43	63.97	76.10	67.05	51.08	44.40	61.005 —.134
September 28.		12h.,	30m.				
179 55	63.8	63.3	80.2	65.4	50.0	43.8	61.08
	63.3	65.0	81.5	65.5	52.5	42.7	61.75
	64.0	64.2	80.7	66.5	50.7	43.8	61.65
P.	64.2	65.2	81.8	66.4	52.3	43.8	62.28
	64.2	65.2	81.4	64.7	51.8	43.3	61.77
	64.2	65.2	81.5	66.3	52.2	43.3	62.12
Means	63.95	64.68	81.18	65.80	51.58	43.45	61.775 —.133

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
25, No. 2	71.3	73.5 75.0	73.3 72.5
28, " 1	68.5	67.5	67.5

7 to 21, 41 to 48. At times obscured by clouds.
22 to 48. Wind fresh and troublesome.
31. Sidereal time of diameter passing, 1s.22, (6 wires.)
37. Very faint.
39, 40. Three observations with micrometer reduced to the meridian.

		H. M. S.	
37.	App. R. A.	0 22 0	(8.9 mag.)
38.	"	0 27 42	(7.8 ")
39.	"	0 30 16	(7 ")
40.	"	0 40 31	(7 ")

	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMET At.	Ext.	St.	U
			No.	M. S.	° ′ ″	″	″	″	″	″	″	*Revs.*	*In.*	°	°	°	
September 28	1	Polaris, S. P. (Mic.) . .	4	— 3 36.2								30.547					
	2			— 1 36.2								.554					
	3			+ 0 12.8								.559					
	4			2 12.8								.554					
	5			4 12.8								.547					
	6			6 12.8								.530					
	7			8 12.8								.517					
	8		3	+ 9 54.8	307 24 61.5	61.4	79.0	63.0	49.0	42.2	59.35	.481	30.216	66.0	66.4		67
	9	Saturn, S. L.	4	. . .	53 37 40.1	44.0	57.2	47.6	28.0	19.3	39.36*d*	. .	30.288	61.5	53.0		58
	10	Saturn, N. L. (Mic.) . .	4	. . .	"	"	"	"	"	"	"	30.307					
	†11	α Piscis Australis . . .	4	. . .	69 16 53.3	59.5	72.2	63.8	44.4	35.0	54.70	. .	30.282	60.0	50.0		56
	†12	Venus, S. L.	4	. . .	32 23 40.8	46.0	55.0	47.2	27.8	22.9	39.95	. .	30.348	61.8	65.3	64.3	66
	†13	Venus, N. L. (Mic.) . .	4	. . .	"	"	"	"	"	"	"	30.180					
29	14	Moon, S. L. .	2	— 0 31.7	55 12 41.1	42.1	55.7	46.5	28.0	21.9	39.22*d*	. .	30.208	65.8	60.3	65.0	65.
	15	(Mic.)	3	— 0 15.4	"	"	"	"	"	"	"	30.049					
	16	(Mic.)	4	+ 0 0.5	"	"	"	"	"	"	"	.072					
	17	(Mic.)	5	0 16.3	"	"	"	"	"	"	"	.099					
	18	(Mic.)	6	+ 0 30.7	"	"	"	"	"	"	"	.123					
	19	λ Ursæ Minoris	4	— 4 57.0	310 3 22.1	22.1	37.1	25.0	11.3	2.1	19.95	. .			59.9		64.
	20			— 0 8.0	22.9	23.7	37.4	25.8	12.0	3.0	20.80	. .	30.210	65.5			
	21			+ 3 14.0	22.8	23.1	37.8	25.9	11.1	2.9	20.60	. .			59.6		63.
	22	α Cygni	4	. . .	354 8 75.9	76.5	90.0	79.8	66.1	56.5	74.13	. .	30.208	65.2	59.5		63.
	23	61^1 Cygni	4	. . .	0 53 22.1	24.0	36.5	28.0	11.4	2.9	20.82*d*	. .	30.210	64.5	59.3		63.
	†24	61^2 Cygni, (Mic.)	4	. . .	"	"	"	"	"	"	"	29.956					
	25	α Cephei	4	. . .	336 57 28.2	27.6	42.9	31.5	16.0	9.0	25.87*d*	. .	30.204	64.5	59.1		62.
	26	β Aquarii	4	. . .	45 6 63.9	65.4	77.0	68.4	50.2	42.1	61.17*d*	. .			58.7		62.
	27	ε Pegasi	4	. . .	29 42 20.7	22.7	34.7	26.6	10.9	1.0	19.44*d*	. .	30.202	64.0	56.3		62.
	†28	Saturn, N. L.	4	. . .	53 38 20.6	23.0	33.9	25.9	9.4	0.9	18.95	. .	30.198	63.5	56.5		62.
	29	Saturn, S. L. (Mic.) . .	4	. . .	"	"	"	"	"	"	"	29.729					
	†30	α Piscis Australis, (Mic.) .	4	. . .	69 16 62.0	65.9	77.4	68.6	51.7	43.0	61.44*d*	30.046	30.182	62.6	53.9		63
	31	α Ursæ Majoris, S. P. . .	4	. . .	281 32 45.8	49.2	62.0	52.7	32.5	26.6	44.80*d*	. .	30.184	61.8	54.1	64.7	63
	32	γ Cephei	4	. . .	322 7 38.5	41.6	55.4	45.9	26.2	20.5	38.02*d*	. .	30.168	61.0	54.2		60
	33	Anonymous, (Mic.) . .	4	. . .	39 19 77.9	81.7	92.6	85.0	68.4	58.5	77.35	31.271	30.160	60.9	55.0		
	34	Weisse O, 246	4	. . .	30 43 59.3	64.0	73.6	66.0	48.0	41.0	58.65	. .	30.156		54.4		
	35	Weisse O, 368	4	. . .	40 2 51.6	56.0	66.0	58.1	39.2	32.3	50.53*d*	. .			54.5		59
	36	Weisse O, 479	4	. . .	40 13 35.1	39.9	50.1	42.4	23.0	16.4	34.48	. .	30.154	60.8	54.5		59
	37	Ceti, 163, (Mic.) . . .	4	. . .	"	"	"	"	"	"	"	30.081					
	†38	Weisse O, 712 (Mic.) .	4	. . .	"	"	"	"	"	"	"	31.319					
	39	Weisse O, 772 (Mic.) .	4	. . .	"	"	"	"	"	"	"	31.538					
	40	Weisse I, 40	4	. . .	41 40 47.4	53.2	64.1	56.9	36.4	29.5	47.92	. .	30.150	60.5	54.6		59
	†41	Weisse I, 225 (Mic.) . .	4	. . .	"	"	"	"	"	"	"	30.082	30.148	60.2	54.3		
	†42	Weisse I, 564 (Mic) . .	4	. . .	42 10 56.9	62.0	72.0	64.0	45.9	37.2	56.33	30.443	30.142	60.2	53.9	64.5	58
	43	Weisse I, 594	7	. . .	42 16 32.1	37.1	48.1	40.6	21.1	13.4	32.07	. .			54.3		58
30	44	α Aquilæ	4	. . .	30 24 47.4	48.0	60.7	51.6	33.4	27.5	44.77	. .	29.928	67.0	64.1		67
	45	α^1 Capricorni, (Mic.) . .	6	. . .	"	"	"	"	"	"	"	32.185	29.928	67.0	64.0	64.0	67
	46	α^2 Capricorni	4	. . .	51 52 75.3	75.3	86.5	78.3	62.7	54.4	72.08	. .					
	47	Moon, S. L. (Mic.) . .	1†	— 0 42.6	51 43 76.3	75.8	88.6	78.8	63.4	54.6	72.92	30.003	29.926	66.5	61.8		
	48		3†	— 0 12.9	"	"	"	"	"	"	"	.100					
	49		5†	+ 0 18.8	"	"	"	"	"	"	"	.198					
	50		7†	+ 0 49.0	"	"	"	"	"	"	"	.263					
	51	Polaris, (Mic.)	3	— 9 49.6	310 24 65.7	64.8	79.4	67.4	52.0	43.2	62.08	29.845	29.912	63.2	54.7		
	52			7 49.6								.821					

DATE.	MICROMETER. Coincid.	Val. 1 r.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Sept. 28,		62.75	Saturn .	9	0 9.37
			Venus .	12	0 5.46
" 29, 20*h*.	30.006		Saturn .	28	0 8.69
" 30, 21*h*.	30.004				

Sept. 29. Error of Runs —0″.18. Temp. of circle 63°; of stone 65°
Sept. 30. do. do. .02 do. do. 65° do. 65°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

	CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
	nstrument.	Objects.		359° 59′		1850.0	
	′ ″	′ ″	° ′ ″	″	° ′ ″	″	
	—0 34.47	— 1 14.13	307 23 10.72	61.64	+ 88 29 29.61	+65.03	P.
	34.40	.14	10.78				
	34.60	.14	10.58				
	34.55	.15	10.62				
	34.78	.15	10.39				
	34.81	.16	10.35				
	34.50	.16	9.66				
	—0 34.82	— 1 14.17	10.33				
	+0 0.07	+ 1 18.44	53 38 48.50	60.65	— 14 45 8.60		
	—0 18.65	1 18.43					
	+0 0.21	2 34.14	69 19 29.05		— 30 25 49.15	53.17	
	+0 0.01	0 33.40	32 24 7.90	60.56	+ 6 29 31.91		
	—0 10.81	+ 0 33.29					C.
	3.85	—63 28.52	54 9 6.76		— 15 15 26.95		
	4.57						
	4.00						
	3.74						
	—0 3.53						
	+0 0.96	1 8.33	310 2 12.58		+ 88 51 27.25	11.12	
	0.01	.35	.46				
	+0 0.40	1 8.37	.63				
22	—0 0.02	— 0 5.90	354 9 8.21		+ 44 44 31.61	16.26	
23	+0 0.10	+ 0 0.89	0 53 21.81		+ 38 0 18.00	33.56	
24	3.19	+ 0 0.89	0 53 24.90		+ 38 0 14.91	32.80	
25	0.06	— 0 24.51	336 57 1.42		+ 61 56 38.39	25.43	
26	0.04	+ 0 57.83	45 7 59.04		— 6 14 19.23	36.84	
27	+0 0.05	0 33.04	29 42 52.53		+ 9 10 47.28	35.88	
28	—0 0.05	1 17.72	53 39 45.31		— 14 46 5.50		
29	+0 17.31	1 17.74					
30	—0 2.49	+ 2 32.49	69 19 31.44		— 30 25 51.63	+53.31	
31	+0 0.07	— 4 37.00	281 28 7.87		+ 62 34 28.06	—54.67	
32	+0 0.06	— 0 45.16	322 6 52.92		+ 76 46 46.89	+54.95	
33	—1 19.23	+ 0 47.47	39 19 45.59		— 0 26 5.78	53.74	
34	—0 0.06	0 48.22	39 44 46.81		— 0 51 7.00	54.29	
35	+0 0.08	0 48.75	40 3 39.36		— 1 9 59.55	54.37	
36	—0 0.08	0 49.06	40 14 23.46		— 1 20 43.65	54.39	
37	0 4.75	0 49.06	40 14 18.79		— 1 20 38.98	54.39	
38	1 22.35	0 49.02	40 13 1.15		— 1 19 21.34	54.27	
39	—1 36.12	0 49.01	40 12 47.37		— 1 19 7.56	54.20	
40	+0 0.05	0 51.62	41 41 39.59		— 2 47 59.78	53.50	
41	—0 4.69	0 51.64	41 41 34.87		— 2 47 55.06	52.95	
42	27.30	0 52.58	42 11 21.61		— 3 17 41.80	51.68	
43	0.07	0 52.72	42 17 24.72		— 3 23 44.91	51.58	
44	0.00	0 33.18	30 25 17.95	61.21	+ 8 28 22.51	10.85	P.
45	—2 16.90	1 11.86	51 52 7.04		— 12 58 26.58	22.69	
46	+0 0.04	+ 1 11.96	51 54 24.08		— 13 0 43.62	+22.82	
47	—0 7.18	—62 7.25	50 41 57.68		— 11 48 17.22		
48	7.88						
49	8.77						
50	8.13						
51	+0 14.87	1 7.46	310 24 9.33				
52	14.58	.47	9.03				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
September 28.		19*h*.,	30*m*.				
179° 59′	62″5	63″7	78″0	68″0	49″0	42″5	60″62
	62.2	64.4	78.0	67.2	50.6	41.2	60.60
P.	63.0	64.0	78.0	68.3	49.7	42.7	60.95
	63.0	64.0	78.0	68.3	50.5	42.0	60.97
Means	62.67	64.03	78.00	67.95	49.95	42.10	60.783 —.132
September 29.		22*h*.					
179 59	61.0	65.2	76.2	67.0	51.4	41.2	60.33
	62.0	66.1	77.0	68.1	51.9	42.5	61.27
	61.2	65.7	76.9	67.4	50.9	41.9	60.67
C.	61.7	65.3	76.3	67.8	49.9	43.0	60.67
	61.4	65.4	76.0	68.4	49.9	42.4	60.58
	61.6	65.1	76.1	68.8	49.9	42.3	60.63
Means	61.48	65.47	76.41	67.92	50.65	42.22	60.692 —.133
September 30.		20*h*.,	30*m*.				
179 59	65.0	64.0	77.5	66.3	49.5	44.0	61.05
	64.5	64.8	78.6	66.3	52.2	43.0	61.57
	65.2	63.6	77.4	66.6	49.3	44.6	61.12
P.	64.6	64.6	78.6	66.6	51.3	42.7	61.40
	64.6	64.6	78.6	66.6	51.6	42.7	61.45
	64.6	64.6	78.6	66.6	51.6	42.7	61.45
Means	64.75	64.37	78.22	66.50	50.92	43.28	61.339 —.133

THERMOMETERS.

NADIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
pt. 28, No. 2	68.0	63.5	64.0
" 29, " 1	64.8	63.0	63.8
		64.9	64.4
" 30, " 1	64.0	67.5	65.5

		H.	M.	S.	
33.	App. R. A.	23	54	17	(9 mag.)
34.	"	0	14	2	(7.8 ")
35.	"	0	22	2	(7 ")
36.	"	0	27	43	(6.7 ")
37.	"	0	30	17	(6.7 ")
38.	"	0	40	32	(7 ")
39.	"	0	43	50	(8.9 ")
40.	"	1	3	27	(9 ")
41.	"	1	14	2	(9 ")
42.	"	1	31	53	
43.	"	1	33	2	

11. Extremely unsteady.
12, 13. Very unsteady.
13. Cor. of N. L. for defective illumination, —0″.11.
24. 61^2 Cygni follows 61^1 1*s*.60, (5 wires.)
28. Sidereal time of diameter passing, 1*s*.14, (5 wires.)
30, 41. Three obs. with mic. reduced to the meridian.
38. Four obs. with mic. reduced to the meridian.
42. Two obs. with mic. reduced to the meridian.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMETE At.	Ext.	St.	Up.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
September 30	1			— 5 49.6								29.796					
	2			3 49.6								.787					
	3			1 49.6								.777					
	†4	Polaris, (Mic.) . . .	4	— 0 7.6								.764					
	5			+ 1 52.4								.764					
	6			3 52.4								.773					
	7			5 52.4								.787					
	8			7 52.4								.804					
	9		5	9 44.4	310 24 64.8	65.4	79.0	66.6	52.0	42.7	61.75	.835	29.902	62.0	54.2		60.
October 1	10	Sun, N. L., (Mic.) . .	4	0 3.7	41 49 65.6	70.0	79.1	72.1	54.7	47.2	64.78	29.719	29.888	66.2	73.0		71.
	11	Sun, S. L.	5†	0 20.7	42 22 27.0	31.1	40.3	35.2	15.7	8.9	26.37*d*	. .					71
	12	α Cygni	4	. . .	354 18 76.6	77.5	91.2	80.2	67.8	57.1	75.07	. .	29.832	68.0	64.5	65.0	66
	†13	ζ Cygni	4	. . .	9 16 67.5	69.1	80.0	72.3	56.1	46.3	65.22*d*	. .	29.832	67.5	63.4		65
	†14	Moon, S. L.	4†	+ 0 6.5	47 23 42.1	41.9	64.3	47.9	27.0	22.5	40.95	. .	29.836	63.8	61.6		68
5	15		1	— 0 45.7	43 22 59.6	61.8	72.1	63.5	44.6	39.0	56.77*d*	29.782	30.196	65.7	67.9	64.7	67
	16	Sun, N. L., (Mic.) . .	2	0 28.7	"	"	"	"	"	"	"	.772					
	17		3	— 0 14.7	"	"	"	"	"	"	"	.798					
	18		4	+ 0 2.3	43 55 26.8	29.1	39.0	32.2	13.1	7.2	24.57	30.112			67.6		68
	19	Sun, S. L., (Mic.) . .	5	0 16.3	"	"	"	"	"	"	"	.108					
	20		6	0 32.3	"	"	"	"	"	"	"	.091					
	21		7	+ 0 47.3	"	"	"	"	"	"	"	.099					
	22			— 4 16.7	310 3 22.2	22.9	38.0	25.6	10.0	1.1	19.97	. .	30.192	64.3	59.0	65.0	64
	23	λ Ursæ Minoris	4†	+ 0 15.3	22.1	23.6	38.2	26.1	11.4	2.0	20.57	. .					
	24			3 18.3	21.6	23.1	37.8	26.8	10.2	1.6	20.18	. .	30.192	64.5	58.6		64
	25	61¹ Cygni		. . .	0 53 21.1	24.3	37.8	27.6	11.6	1.9	20.72	. .	30.206	63.9	57.7		64
	†26	61² Cygni, (Mic.)	4	. . .	"	"	"	"	"	"	"	29.931					
	27	α Cephei	4	. . .	336 57 25.9	27.1	43.2	30.4	15.1	6.0	24.62*d*	. .	30.204	63.8	57.4		62
	28	β Cephei	4	. . .	329 0 32.8	35.8	50.0	38.2	21.2	13.1	31.85	. .			56.9		62
	†29	ε Pegasi	4	. . .	29 42 20.8	23.4	35.8	28.6	11.3	1.1	20.17*d*	. .	30.210	63.2	56.0		61
	30	Saturn, S. L.	4	. . .	53 42 62.3	65.7	76.6	67.8	51.4	42.0	60.97*d*	. .	30.210	62.5	56.0		60
	31	Saturn, N. L., (Mic.) . .	4	. . .	"	"	"	"	"	"	"	29.706					
	32	α Piscis Australis . . .	4	. . .	69 67 59.2	63.4	75.9	66.7	48.0	40.2	58.90*d*	. .	30.220	61.5	56.1		60
	33	γ Pegasi	4	. . .	24 32 71.0	74.2	85.9	75.1	60.0	48.2	69.07	. .	30.236	60.2	55.4		58
	34	Weisse O, 246 . . .	4	. . .	39 43 59.0	63.7	74.1	66.9	48.9	40.9	58.92	. .			55.4		58
	35	Weisse O, 368 . . .	4	. . .	40 2 50.5	55.5	66.1	58.6	38.9	32.0	50.27*d*	. .	30.244	60.2	55.3		58
	36	α Cassiopeiæ	4	. . .	343 11 64.1	66.5	79.5	69.5	53.8	45.4	63.14*d*	. .			55.5		58
	37		3	— 9 53.5	310 24 70.8	75.0	87.7	76.9	62.3	50.7	70.57	. .	30.248	60.0	55.0	64.6	58
	38	(Mic.)		7 9.5								29.971					
	39	(Mic.)		6 49.5								.958					
	40	(Mic.)		6 29.5								.950					
	41	(Mic.)		6 9.5								.960					
	42	(Mic.)		5 49.5								.942					
	43			3 24.5	75.0	78.6	91.8	82.0	66.1	55.0	74.75	. .					
	44	Polaris . . .	4	— 0 11.5	76.1	79.4	92.8	83.1	67.2	56.9	75.92	. .			55.0		58
	45			+ 3 34.5	75.4	78.9	91.6	83.2	66.1	56.1	75.22	. .					
	46	(Mic.)		5 55.5								30.028					
	47	(Mic.)		6 15.5								.030					
	48	(Mic.)		6 35.5								.036					
	49	(Mic.)		6 55.5								.038					
	50	(Mic.)		7 15.5								.040					
	51		5†	+ 9 54.5	71.6	74.4	86.9	78.8	61.2	52.0	70.82	. .	30.250	59.8	54.8		58.
	52	Weisse I, 594	4	. . .	42 16 30.4	35.9	47.3	40.1	20.1	11.0	30.80	. .	30.250	59.8	54.3		

DATE.	MICROMETER. Coincid.	Val. 1 *r*.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Oct. 1, 13*h*.	30.001	62.75	Sun . .	10	16 2.77
" 5, 13*h*.	30.005		Sun . .	15	16 4.04
			Saturn .	30	0 9.40

Oct. 1. Error of Runs —0″.06. Temp. of circle 66° ; of stone 65°
Oct. 5. do. .23 do. 62° do. 65°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
Instrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
+0 14.75	− 1 7.47	310 24 9.20	61.21	+ 88 29 30.99	+64.01	P.
14.33	.48	8.77				
14.40	.48	8.84				
15.06	.49	9.49				
15.26	.49	9.69				
15.29	.50	9.71				
15.44	.50	9.86				
15.81	.51	10.22				
15.57	− 1 7.52	9.97				
0 16.65	+ 0 43.97	42 7 8.17	60.78	− 3 13 28.14		C.
0 0.21	+ 0 44.84					
0 0.01	− 0 5.44	354 19 9.62		+ 44 44 30.41	15.97	
0 0.08	+ 0 9.23	9 17 14.53		+ 29 36 25.50	25.23	
1 26	−59 45.47	46 23 56.74		− 7 30 16.71		
14.55	+ 0 47.62	43 40 2.69	60.38	− 4 46 23.06		
15.01						
0 13.22						
0 6.66	+ 0 48.57					
6.62						
5.81						
0 6.55						
0 0.69	− 1 8.41	310 3 12.25		+ 88 51 27.48	10.21	
0.00	.44	.13				
0.42	− 1 8.47	.13				
0.02	+ 0 0.90	0 53 21.64		+ 38 0 17.99	32.65	
4.66	+ 0 0.90	0 53 26.28		+ 38 0 13.35	31.90	
0.08	− 0 24.59	336 57 0.11		+ 61 56 39.52	24.12	
0.02	− 0 34.75	328 59 57.12		+ 69 53 42.51	26.95	
0.07	+ 0 33.07	29 42 53.31		+ 9 10 46.32	35.59	
0.11	1 18.06	53 44 28.54		− 14 50 48.91		
18.89	1 18.08					
0.12	2 32.10	69 19 31.12		− 30 25 51.49	54.18	
0 0.08	0 26.54	24 33 35.53		+ 14 20 4.10	53.22	
0 0.04	0 48.27	39 44 47.15		− 0 51 7.52	54 25	
0 0.10	+ 0 48.83	40 3 39.20		− 1 9 59.57	54.36	
0.06	− 0 17.55	343 11 45.65		+ 55 41 53.98	56.13	
0 5.06	− 1 8.20	310 24 7.43		+ 88 29 32.11	62.24	
4.74	.21	7.10				
5.32	.21	7.68				
5.39	.21	7.75				
4.73	.21	7.09				
5.66	.21	8.02				
0.61	.22	7.14				
0.02	.22	7.72				
0.67	.22	7.67				
0.47	.23	7.46				
0.56	.23	7.55				
0.41	.23	7.40				
0.51	.23	7.50				
0.63	.23	7.62				
5.07	− 1 8.24	7.65				
+0 0.14	+ 0 52.91	42 17 23.85		− 3 23 44.22	+51.69	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
October 1.		21*h*.,	30*m*.				
179° 59′	62″9	64″8	76″2	68″0	50″9	44″3	61″18
	62.1	64.1	76.1	67.1	50.1	43.0	60.42
	62.0	65.8	77.1	67.9	52.0	42.9	61.28
C.	62.1	65.0	76.9	67.3	51.2	42.8	60.88
	62.0	65.2	76.8	67.0	51.2	42.6	60.80
	62.0	65.1	77.1	67.4	51.6	42.4	60.93
Means	62.18	65.00	76.70	67.45	51.17	43.00	60.917 —.133
October 5.		22*h*.					
179 59	60.8	65.4	76.8	67.7	50.0	41.1	60.30
	60.9	65.8	77.1	67.9	50.9	41.2	60.63
	61.9	65.0	76.1	69.1	49.0	42.9	60.67
C.	60.6	65.2	76.2	68.1	50.1	41.0	60.20
	60.9	66.0	77.1	68.0	51.1	41.3	60.73
	60.8	65.9	77.0	67.9	50.7	41.0	60.55
Means	60.98	65.55	76.72	68.12	50.30	41.42	60.514 —.133

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
1, No. 1	65.0	66.2 68.5	66.0 66.4
5, " 1	65.0	61.2 63.0	62.5 62.5

H. M. S.
34. Apparent R. A. 0 14 2 (8 mag.)
35. " " 0 22 1
52. " " 1 33 1 (7 mag.)
4, 29. Very unsteady.
13. Nearly obscured by clouds.
14. Obscured until after transit of fourth wire.
26. 61^2 Cygni follows 61^1 1s.67, (6 wires.)
Nadir Points, October 1 & 5. Apparent error of collimation, 8″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.									Barometer.	THERMOMET			
						A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up
			No.	M. S.	° '	"	"	"	"	"	"	"	Revs.	In.	°	°	°	°
October 5	1	Moon, N. L., (Mic.) .	1	− 0 47.3	27 35	49.9	56.5	68.1	59.5	39.8	31.1	50.82	30.441	30.254	59.2	53.5	64.5	57.
	2		2†	0 29.0		"	"	"	"	"	"	"	.476					
	3		3†	− 0 12.7		"	"	"	"	"	"	"	.542					
	†4	Moon, S. L., (Mic.) . .	5†	+ 0 15.2	28 7	76.1	82.2	93.0	85.9	68.9	57.2	77.22	30.126					57.
	5		6†	0 35.4		"	"	"	"	"	"	"	.150					
	†6		7	0 49.8		"	"	"	"	"	"	"	.190					
	†7	Venus, S. L.	4	. . .	35 44	29.3	30.5	44.2	35.0	16.3	7.4	27.12	. .	30.340	62.8	66.6	61.5	65.
	†8	Venus, N. L. (Mic.) . .	4	. . .		"	"	"	"	"	"	"	30.177					
6	9	Sun, S. L. (Mic.) . . .	5	0 14.3	44 18	61.3	64.3	76.0	66.2	49.3	40.3	59.57	30.626	30.328	64.0	67.6		
	†10	Sun, N. L.	7	+ 0 48.3	43 45	77.7	80.0	93.0	84.2	66.5	57.3	76.45	. .					
	11	γ Aquilæ	4	. . .	28 37	69.5	68.7	82.0	73.0	58.4	47.2	66.47	. .	30.290	66.0	63.5		
	12	α Aquilæ	4	. . .	30 24	40.7	39.8	55.4	45.2	27.5	20.8	38.23	. .					
	13	β Aquilæ	4	. . .	32 50	60.6	61.0	74.8	64.3	48.6	40.5	58.30	. .	30.290	66.0	63.5	63.0	66
	14	α Cygni	4	. . .	354 8	69.8	69.3	83.8	72.4	58.8	49.6	67.28	. .	30.298	65.7	60.3		65
	15	61¹ Cygni	4	. . .	0 52	77.0	77.8	90.7	81.6	67.2	55.8	75.02	. .	30.298	65.0	59.2		
	16	α Cephei	4	. . .	336 57	20.4	19.0	36.0	23.4	8.7	0.1	17.93*d*	. .	30.298	64.9	59.6		64
	17	β Cephei	4	. . .	329 0	28.6	28.5	44.4	32.2	16.3	7.6	26.27	. .	30.298	64.6	58.5		64
	18	ε Pegasi	4	. . .	29 41	75.7	75.0	90.0	80.6	66.3	55.0	73.77	. .	30.298	64.4	60.0		
	†19	Saturn, S. L.	4	. . .	53 43	59.0	60.0	72.3	62.0	45.3	37.5	56.02	. .	30.300	64.3	59.5		63
	20	Saturn, N. L. (Mic.) . .	4	. . .		"	"	"	"	"	"	"	30.300					
	21	α Cassiopeiæ	4	. . .	343 11	59.0	59.4	74.8	62.3	47.3	39.5	57.05	. .	30.302	62.7	59.3	63.5	62.
	22	Polaris, (Mic.)	3	− 9 57.4	310 24	63.0	63.2	78.0	65.2	50.0	41.2	60.10	29.936	30.302	62.5	58.5	63.5	62.
	23			7 57.4									.907					
	24			5 57.4									.878					
	25			3 57.4									.864					
	26			1 57.4									.860					
	27		4	− 0 20.4									.853					
	28			+ 1 39.6									.853					
	29			3 39.6									.872					
	30			5 39.6									.883					
	31			7 39.6									.904					
	32		5	+ 9 27.6									.932	30.302	62.1	58.5		
7	33	Sun, N. L., (Mic.) . .	1	− 0 46.5	44 8	31.1	34.1	44.4	38.5	18.1	11.6	29.63	29.352	30.328	66.0	71.6	63.0	69.
	34		2	0 31.0		"	"	"	"	"	"	"	.326					
	35		3	− 0 14.5		"	"	"	"	"	"	"	.335					
	36	Sun, S. L., (Mic.) . .	5	+ 0 14.5	44 41	22.8	23.8	35.7	28.9	9.0	1.9	20.35	30.066			72.7		71.
	37		6	0 30.5		"	"	"	"	"	"	"	.058					
	38		7	+ 0 46.5		"	"	"	"	"	"	"	.061					
	39	61¹ Cygni	4	. . .	0 53	76.0	77.2	89.9	80.2	67.7	56.4	74.57	. .	30.290	67.8	64.5	64.2	67.
	†40	61² Cygni, (Mic.)	4	. . .		"	"	"	"	"	"	"	29.956					
	41	α Cephei	4	. . .	336 57	20.7	19.9	36.0	22.6	9.8	0.9	18.32*d*	. .	30.292	67.8	64.5		67.
	42	β Aquarii	4	. . .	45 6	59.0	59.8	72.5	63 0	46.0	38.2	56.42*d*	. .			64.3		67.
	43	ε Pegasi	4	. . .	29 41	77.7	77.5	91.0	81.5	67.3	57.0	75.33*d*	. .	30.296	67.5	63.9		
	†44	Saturn, N. L.	4	. . .	53 43	80.9	81.1	94.4	84.9	69.9	59.9	78.52	. .	30.298	67.4	63.3		66
	45	Saturn, S. L., (Mic.) . .	4	. . .		"	"	"	"	"	"	"	29.725					
	†46	γ Cephei, (Ref.) (Mic.) .	1	− 3 27.5	217 51	39.8	39.5	53 2	45.8	23.8	22.1	37.37	29.192	30.316	66.0	61.7		65
	47		2	2 19.4									.228					
	†48		3†	− 0 18.7									.289					
	49	γ Cephei . . .	4†	+ 0 35.3	322 7	29.2	29.5	44.7	34.5	17.2	9.9	27.50*d*	. .				64.2	65.
	50	(Mic.)	6	2 12.4									30.032					
	51	(Mic.)	7	+ 3 20.3									.091					
	52	α Andromedæ	4	. . .	10 38	33.8	35.5	48.2	39.8	22.0	14.9	32.37	. .	30.320	65.8	60.8		65.

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r.*	Objects.	No.	Semi-diam.
	revs.	"			' "
Oct. 5,		62.75	Moon .	1	16 16.87
			Venus .	7	0 5.39
" 6, 13*h.*	30.005		Sun . .	9	16 2.96
			Saturn .	19	0 9.17
" 7, 13*h.*	30.006		Sun . .	33	16 2.83
			Saturn .	44	0 8.81

Oct. 6. Error of Runs +0''.03. Temp. of circle 64°; of stone 63°
Oct. 7. do. .12 do. 66° do. 64°
Oct. 6, 13*h*. Telescope moved by an accidental blow.
Oct. 7. Zenith Point, by observation of γ Cephei, 359° 59' 55''.45; east end of axis elevated 7''.

ASSUMED LATITUDE 38° 53' 39''.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 35.07	—26 51.37	27 24 41.34	60.38	+ 11 28 58.29		C.
34.22						
35.64						
4.94	—27 15.50					
2.87						
2.73						
0.00	+ 0 37.95	35 44 59.68		+ 3 8 39.95		P.
10.67	0 37.84					
38.98	0 49.53	44 3 7.16		— 5 9 27.53		
0 0.81	0 48.57					
0 0.02	0 31.28	28 38 37.77	55.62	+ 10 14 57.10	+ 7.88	
0 0.01	0 33.62	30 25 11.86		+ 8 28 23.01	10.76	
0 0.02	+ 0 36.99	32 51 35.27		+ 6 1 59.60	9.87	
0 0.02	— 0 5.91	354 9 1.39		+ 44 44 33.48	15.32	
0.05	+ 0 0.90	0 53 15.97		+ 38 0 18.90	32.51	
0.08	— 0 24.55	336 56 53.46		+ 61 56 41.41	23.91	
0.00	— 0 34.75	328 59 51.52		+ 69 53 43.35	26.71	
0.05	+ 0 32.91	29 42 46.73		+ 9 10 48.14	35.55	
0 0.03	1 17.81	53 45 4.69		— 14 51 29.82		
0 18.29	+ 1 17.79					
0 0.05	— 0 17.45	343 11 39.65		+ 55 41 55.22	55.83	
9.32	1 7.86	320 24 1.56		+ 88 29 33.22	61.88	
9.32	.86	.56				
9.72	.86	.96				
9.60	.86	.84				
9.24	.86	.48				
9.52	.86	.76				
9.67	.86	.91				
9.05	.86	.29				
9.34	.86	.58				
9.43	.86	.67				
9.29	— 1 7.86	.53				
41.51	+ 0 48.76	44 26 3.54	55.62	— 5 32 28.67		C.
43.07						
+0 42.39						
—0 3.80	0 49.74					
3.48						
—0 3.87						
+0 0.06	0 0.88	0 53 15.51		+ 38 0 19.36	32.38	
3.16	+ 0 0.88	0 53 18.61		+ 38 0 16.26	31.63	
0.08	— 0 24.32	336 56 54.08		+ 61 56 40.79	23.71	
0.10	+ 0 57.38	45 7 53.90		— 6 14 19.03	36.98	
0.08	0 32.66	29 42 48.07		— 9 10 46.80	35.51	
0.02	1 17.23	53 45 44.58		— 14 52 9.71		
17.63	1 17.24					
45.66	+ 0 44.73	217 53 7.79		+ 76 46 51.42	52.18	
46.34						
45.07						
0.23	— 0 44.73	322 6 43.10		+ 76 46 51.77	52.18	
+0 0.79						
—0 0.03						
+0 0.04	+ 0 10.83	10 38 43.24		+ 28 14 51.63	+51.95	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
October 6.		20h.					
179° 59′	58″8	58″3	72″8	62″3	43″3	39″2	55″87
	58.0	59.0	73.5	61.6	46.0	37.2	55.88
	58.5	59.0	73.0	61.4	44.3	38.0	55.70
P.	58.5	59.0	73.2	61.4	45.0	38.8	55.98
	58.5	59.0	72.6	61.4	44.8	38.0	55.72
	57.6	58.8	72.4	61.4	44.5	38.0	55.45
Means	58.32	58.85	72.92	61.58	44.65	38.20	55.752 —.131
October 7.		0h.,	20m.				
179 59	57.0	60.3	73.0	61.9	47.0	37.9	56.18
	57.3	59.7	72.4	62.4	45.0	38.1	55.82
	56.9	59.9	72.2	62.0	45.0	38.1	55.68
C.	57.4	59.0	71.7	62.9	43.9	39.0	55.65
	57.2	59.1	72.0	62.5	44.0	38.6	55.57
	57.1	59.2	71.9	62.6	44.1	38.7	55.60
Means	57.15	59.53	72.20	62.38	44.83	38.40	55.750 —.133

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
6, No. 1	63.0	66.0	65.0
7, " 1	64.5	65.3	64.9
		65.6	64.9

4 to 6. Cor. of S. L. for defective illumination, +5″.35.
7 to 10. Zenith Point doubtful.
7, 8. Limbs poorly defined; hazy.
8. Cor. of N. L. for defective illumination, —0″.10.
19. Sidereal time of diam. passing, 1s.30, (5 wires.)
40. 61² Cygni follows 61¹ 1s.72, (5 wires.)
44. Sidereal time of diam. passing 1s.52, (6 wires.)
46 to 48. Mercury at times very unsteady.
Nadir Point, Oct. 7. Apparent error of collimation, 25″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMET			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	
October 7	1	γ Pegasi	4	. . . .	24 32 67.5	67.1	84.0	69.1	55.1	45.0	64.63	. .	30.322	65.8	61.0		65.
	2	Uranus, S. L.	4	. . . .	34 43 56.6	57.1	70.8	58.8	41.1	35.4	53.30	. .	30.326	65.2	60.7		65.
	3	Uranus, N. L. (Mic.) .	4	. . . .	“	“	“	“	“	“	“	30.056					
	4	ϑ^1 Ceti	4	. . . .	47 50 57.1	57.1	70.2	61.5	44.4	37.1	54.57	. .	30.330	64.9	59.6	64.7	64
	5	Weisse I, 564 . . .	4	. . . .	42 10 27.8	30.4	43.1	35.0	16.9	8.6	26.97	. .	30.330	64.8	59.5		64
	6	Weisse I, 715 . . .	4	. . . .	42 45 32.1	34.2	46.1	38.0	19.9	12.4	30.45	. .			58.8		
	7	Weisse I, 727, (Mic.) .	4	. . . .	“	“	“	“	“	“	“	22.681					
	8	Weisse I, 813, (Mic.) .	4	. . . .	“	“	“	“	“	“	“	30.310	30.332	64.2	59.2		
	9	Weisse I, 942 . . .	4	. . . .	42 59 23.0	26.0	38.6	29.0	11.9	3.0	21.92	. .			59.3		63
	10	α Arietis	4	. . . .	16 8 70.2	72.0	88.4	73.1	58.4	49.0	68.52	. .	30.334	64.2	59.0		63
8	11	α Cygni	4	. . . .	354 8 71.8	69.8	86.2	71.3	62.2	50.4	68.62	. .	30.364	69.8	64.8	66.0	70
	12	61^1 Cygni	4	. . . .	0 52 77.8	77.3	91.0	79.6	67.3	57.2	75.03	. .		69.2	64.2		69
	13	61^2 Cygni, (Mic.)	4	. . . .	“	“	“	“	“	“	“	29.963					
	14	β Aquarii	4	. . . .	45 6 61.2	59.7	73.7	62.8	46.6	39.0	57.17	. .	30.364	68.6	63.0		67
	15	ε Pegasi	4	. . . .	29 41 78.2	76.3	91.4	81.0	66.6	57.7	75.20	. .	30.364	68.5	62.7		
	†16	Saturn, S. L.	4	. . . .	53 44 77.8	77.2	90.3	80.5	65.6	56.8	74.70	. .	30.364	68.0	62.7		67.
	17	Saturn, N. L. (Mic.) .	4	. . . .	“	“	“	“	“	“	“	30.307					
	18	Uranus, S. L.	4	. . . .	34 44 53.5	54.6	68.7	55.3	39.5	32.3	50.65	. .	30.354	66.0	60.6		
	19	Uranus, N. L. (Mic.) .	4	. . . .	“	“	“	“	“	“	“	30.093					
	†20		3	—10 5.0	310 24 60.2	59.5	75.0	61.7	46.5	38.8	56.95	29.905	30.354	66.0	60.6		64.
	21			8 5.0								.877					
	22			6 5.0								.850					
	23			4 5.0								.838					
	24			2 5.0								.835					
	25	Polaris, Mic.	4	— 0 21.0								.823					
	26			+ 1 39.0								.818					
	27			3 39.0								.835					
	28			5 39.0								.842					
	†29			7 39.0								.870					
	30		5	+ 9 26.0								.890	30.355	65.0	61.0		
9	31	α Cygni	5	. . . .	354 8 72.2	71.8	86.1	74.0	62.1	52.8	69.83	. .	30.200	71.4	67.8	67.7	71.
	†32	61^1 Cygni	4	. . . .	0 52 75.4	76.1	88.8	80.0	65.9	56.4	73.77	. .	30.198	71.1	65.5		70.
	33	ζ Cygni	4	. . . .	9 16 62.6	62.8	75.7	65.1	51.0	41.7	59.82*d*	. .			65.4		69.
	34	β Aquarii	4	. . . .	45 6 59.6	60.0	73.1	63.1	46.8	39.0	56.93	. .	30.192	70.5	65.0		69.
	35	ε Pegasi	4	. . . .	29 41 78.7	82.5	92.0	78.3	68.1	58.6	76.37*d*	. .	30.192	70.3	65.0		69.
	36	Saturn, S. L.	4	. . . .	53 45 51.0	52.4	65.9	55.1	38.0	32.1	49.08	. .	30.194	70.0	64.8		69.
	37	Saturn, N. L. (Mic.) .	4	. . . .	“	“	“	“	“	“	“	30.302					
	38	α Aquarii	4	. . . .	39 55 78.0	78.9	92.0	83.0	67.7	58.0	76.27	. .	30.194	70.0	64.6		
	39	α Piscis Australis . . .	4	. . . .	69 16 57.1	59.1	73.9	63.5	45.0	39.1	56.28	. .	30.192	68.7	64.2		
	†40	α Ursæ Majoris, S. P. . .	4½	+ 0 20.6	281 32 34.6	33.6	48.6	39.0	20.1	14.8	31.78*d*	. .	30.190		64.4	67.7	67
	41	γ Cephei, (Ref.) . (Mic.)	1	— 3 27.3	”	”	”	”	”	”	”	29.954	30.188	68.0	63.6	67.7	67
	42		2	2 20.1	217 52 32.6	31.4	46.1	36.5	17.1	13.3	29.51*d*	. .					
	43	(Mic.)	3	1 13.1	“	“	“	“	“	“	“	30.046					
	44	γ Cephei . . .	4	— 0 2.8	322 7 30.3	28.8	46.1	34.0	17.4	10.3	27.82*d*	. .					
	†45	(Mic.)	5	+ 1 4.7	“	“	“	“	“	“	“	30.020					
	46	(Mic.)	6	2 11.2	“	“	“	“	“	“	“	.036					
	47	(Mic.)	7	+ 3 18.9	“	“	“	“	“	“	“	.091					
	48	Venus, S. L.	4	. . . .	37 41 55.7	58.0	71.7	61.5	42.3	36.6	54.30	. .	30.346	62.8	61.0	66.5	6
	†49	Venus, N. L. (Mic.) . .	4	. . . .	“	“	“	“	“	“	“	30.207					
10	†50		5	— 9 27.1	307 24 65.0	66.5	81.2	67.6	52.8	46.0	63.18	30.544	30.350	63.5	60.8		
	51			7 27.1								.572					
	†52	Polaris, S. P. (Mic.) .		— 5 27.1								.592					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 r.	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Oct. 7,		62.75	Uranus .	2	0 1.56
“ 8, 21*h.*	30.004		Saturn .	16	0 9.45
			Uranus .	18	0 2.77
“ 9, 22*h.*	30.006		Saturn .	36	0 9.22
12*h.*	30.004		Venus .	49	0 6.34

Oct. 8. Error of Runs —0″02. Temp. of circle 65°; of stone 65°
Oct. 9. do. +0.11 do. 68° do. 68°
Oct. 10. do. —0.44 do. 59° do. 66°
Oct. 9, 20*h*. By observation of α Cygni by reflection, east end of axis elevated 7″.
Oct. 9, 23¼*h*. By observation of γ Cephei, Zenith Point 359°59′57″.52; east end of axis elevated 6″.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 0.07	+0 26.33	24 33 31.03	55.62	+ 14 20 3.84	+53.07	C.
0 0.02	0 39.71	34 44 31.47		+ 4 9 3.40		
0 3.10	0 39.71					
0.00	1 3.78	47 51 58.35		− 8 58 23.48	52.27	
0.00	0 52.33	42 11 19.30		− 3 17 44.43	51.85	
0.00	0 53.49	42 46 23.94		− 3 52 49.07	51.19	
7 39.66	0 53.72	42 54 3.83		− 4 0 28.96	51.14	
0 18.92	0 53.44	42 46 4.97		− 3 52 30.10	50.67	
0.00	0 53.88	43 0 15.80		− 4 6 40.93	49.91	
0 0.01	+0 16.77	16 9 25.28		+ 22 44 9.59	51.47	
0 0.03	−0 5.87	354 9 2.78	55.73	+ 44 44 32.20	15.09	P.
0.09	+0 0.89	0 53 16.01		+ 38 0 18.97	32.26	
2.62	0 0.89	0 53 18.54		+ 38 0 16.44	31.51	
0.03	0 57.66	45 7 54.86		− 6 14 19.88	37.00	
0.03	0 32.81	29 42 48.03		+ 9 10 46.95	35.47	
0.00	1 17.54	53 46 22.80		− 14 52 47.82		
0 18.85	1 17.52					
0.00	0 39.77	34 45 27.65		+ 4 8 7.33		
0 5.54	+0 39.77					
0 11.32	−1 7.69	310 24 0.58		+ 88 29 34.30	61.11	
11.21	.69	0.47				
11.46	.68	0.73				
11.19	.68	0.46				
10.75	.67	0.03				
11.32	.67	0.60				
11.78	.66	1.07				
11.28	.66	0.57				
11.83	.66	1.12				
11.47	.65	0.77				
11.81	1 7.65	1.11				
0.04	−0 5.80	354 9 4.07	55.67	+ 41 44 30.85	14.98	C.
0.06	+0 0.88	0 53 14.71		+ 38 0 20.21	32.14	
0.09	0 9.30	9 17 9.17		+ 29 36 25.71	24.40	
0.00	0 57.10	45 7 54.03		− 6 14 19.11	37.02	
+0 0.08	0 32.47	29 42 48.92		+ 9 10 46.00	35.44	
−0 0.02	1 16.80	53 46 56.64		− 14 53 21.72		
18.43	1 16.78					
−0 0.02	0 47.67	39 57 3.92		− 1 3 29.00	41.70	
+0 0.04	+2 29.52	69 19 25.84		− 30 25 50.92	+54.76	
−0 0.01	−4 31.45	281 28 0.32		+ 62 34 25.40	−51.42	
2.24	+0 44.37	217 53 11.50		+ 76 46 55.08	+51.54	
2.37						
−0 2.52						
+0 0.08	−0 44.37	322 6 43.55		+ 76 46 51.37	+51.54	
−0 0.15						
+0 0.54						
−0 0.05						
+0 0.07	+0 41.33	37 42 29.36	56.38	+ 1 11 6.27		P.
−0 12.52	+0 41.24					
38.27	−1 15.32	307 23 9.59				
38.31	.31	9.56				
38.26	.30	9.62				

NADIR POINTS—READINGS.						
A.	B.	C.	D.	E.	F.	Means.
October 8.	20*h.*					
179° 59′ 61″3	56″5	74″5	59″8	43″7	40″0	55″97
60.0	57.8	74.6	59.5	45.6	39.0	56.08
60.2	57.2	73.8	59.5	43.7	39.0	55.57
P. 59.7	58.0	74.3	59.2	45.6	38.8	55.93
59.7	57.3	73.5	60.4	44.3	38.8	55.67
59.3	58.0	74.0	60.2	45.4	38.8	55.95
Means 60.03	57.47	74.12	59.77	44.72	39.07	55.861 —.129
October 9.	22*h.*,	20*m.*				
179 59 57.9	59.0	73.0	60.8	45.9	37.9	55.75
57.6	59.3	73.0	61.1	45.0	38.5	55.75
57.9	59.8	72.9	61.9	45.1	38.9	56.08
C. 57.6	59.1	73.0	61.1	45.1	38.0	55.65
57.6	59.1	73.1	61.1	45.1	38.1	55.68
57.7	59.8	73.1	61.2	45.3	38.1	65.87
Means 57.72	59.35	73.02	61.20	45.25	38.25	55.797 —.131
October 10.	13*h.*	30*m.*				
179 59 58.5	60.2	74.3	62.4	44.3	39.3	56.50
57.6	61.2	75.0	61.2	46.4	37.5	56.48
58.0	60.7	74.4	62.0	44.7	38.8	56.43
P. 57.6	61.3	75.0	62.0	46.4	37.7	56.67
57.6	61.0	74.4	62.0	45.4	38.2	56.43
57.6	61.2	74.4	62.0	45.7	38.5	56.57
Means 57.82	60.93	74.58	61.93	45.48	38.33	56.514 —.131

THERMOMETERS.

DIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
8, No. 1	66.0	71.5	67.5
9, " 1	67.7	68.8	68.0
		69.0	67.6
10, " 1	66.5	66.5	64.5

	H. M. S.	
5. App. R. A.	1 31 53	(8 mag.)
6. "	1 39 26	(7 ")
7. "	1 40 1	(7.8 ")
8. "	1 45 2	(8 ")
9. "	1 52 33	(7 ")

16. Sidereal time of diam. passing, 1*s*.46, (5 wires.)

20 to 29. Light clouds passing ; cap off part of the time.

32. 61^2 Cygni follows 61^1 1*s*.42, (6 wires.)

40, 50 to 52. Very unsteady.

45. Observed between micrometer and fixed wires.

49. Cor. of N. L. for defective illumination, —0″.09.

Nadir Point, Oct. 9. Apparent error of collimation, 15″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMETERS. At.	Ext.	St.	Up.	Lo
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°	°
October 10	†1	Polaris, S. P., (Mic.)	4	− 3 27.1								30.605						
	2			− 1 27.1								.610						
	3			+ 0 18.9								.615						
	4			2 18.9								.600						
	5			4 18.9								.593						
	6			6 18.9								.580						
	7			8 18.9								.563						
	†8		3	+10 4.9								.537	30.350	63.5	61.5		62.5	63
	9	β Cephei	4	. . .	329 0 27.7	28.0	45.5	32.8	15.0	8.3	26.22	. .	30.394	60.2	49.2	66.0	62.5	62
	10	ε Pegasi	4	. . .	29 41 74.4	76.1	64.9	80.6	90.0	54.5	73.42*d*	. .	30.388	59.6	50.0			
	†11	Saturn, S. L.	4	. . .	53 55 78.8	81.8	95.5	85.8	68.4	58.6	78.15	. .	30.388	58.5	50.0		57.5	60
	12	Saturn, N. L., (Mic.) . .	4	. . .	“	“	“	“	“	“	“	30.294						
	†13	Lacertæ, 7765	4	. . .	359 55 48.7	52.8	67.6	57.2	38.3	30.3	49.15	. .	30.394	57.2	49.5		55.5	58
	14	ζ Pegasi	4	. . .	28 50 44.5	49.8	63.2	55.3	33.6	26.4	45.47	. .	30.396	56.0	49.7	*	55.0	58
	15	Polaris, (Mic.)	3	−10 7.4	310 24 64.0	68.8	81.2	69.6	52.3	43.7	63.27	29.958	30.420	53.0	46.3			55
	16			9 7.4								.940						
	17			6 7.4								.905						
	18			4 7.4								.900						
	19			− 2 7.4								.898						
	20			+ 5 38.6								.910						
	21			7 38.6								.933						
	22		5	+ 9 26.6	64.2	68.5	80.3	69.0	52.3	42.4	62.78	.954	30.422	53.0	47.0		52.5	53.
16	23	Polaris, S. P., (Mic.) . .	5†	− 9 20.6	307 24 49.5	52.0	64.7	52.0	38.0	30.3	47.75	30.303	30.050	63.8	66.3			
	24		4	7 20.6								.324						
	25			5 20.6								.341						
	26			3 20.6								.354						
	27			− 1 20.6								.365						
	28			+ 0 18.4								.364						
	29			2 18.4								.364						
	30			4 18.4								.355						
	31			6 18.4								.333						
	32			8 18.1								.306						
	33		3	+10 5.4								.283	30.042	64.0	67.0		66.5	62.
17	34	Sun, S. L., (Mic.) . .	3	− 0 13.9	48 27 27.4	28.0	39.1	31.1	15.6	6.5	24.62*d*	30.738	30.036	64.2	67.7	59.5	67.0	62.
	35	Sun, N. L.	5	+ 0 17.1	47 54 28.0	27.0	40.3	30.5	16.5	6.8	24.83	. .						
19	†36	Sun, N. L., (Mic.) . .	1	− 0 47.4	48 39 63.9	72.0	80.8	74.4	56.9	46.6	65.77	31.978	30.265	50.8	49.2		51.3	51.
	37		2	0 32.4	“	“	“	“	“	“	“	.983						
	38		3	− 0 16.4	“	“	“	“	“	“	“	.986						
	39	Sun, S. L., (Mic.) . .	5	+ 0 17.6	49 10 57.0	65.0	74.1	65.8	48.9	39.4	58.37	30.611					53.8	5
	40		6	0 31.6	“	“	“	“	“	“	“	.626						
	41		7	+ 0 47.6	“	“	“	“	“	“	“	.622						
	42	61^1 Cygni	4	. . .	0 52 72.1	78.7	89.1	82.2	65.1	53.6	73.47	. .	30.230	51.0	40.9	57.5	50.2	
	†43	61^2 Cygni, (Mic.) . . .	4	. . .	“	“	“	“	“	“	“	29.951						
	44	β Cephei	4	. . .	329 0 25.6	30.9	44.3	34.0	15.4	5.8	26.00	. .	30.226	50.5	40.2		50.1	
	†45	Saturn, N. L.	4	. . .	53 49 25.9	32.4	43.9	35.3	16.8	5.8	26.68	. .	30.230	50.2	40.5		48.0	
	46	Saturn, S. L., (Mic.) . .	4	. . .	“	“	“	“	“	“	“	29.722						
	†47	α Aquarii	4	. . .	39 55 72.1	78.1	88.6	82.1	65.0	52.9	73.13	. .	30.230	49.9	39.7		48.[illegible]	
	†48	Lacertæ, 7765	4	. . .	359 55 48.2	53.9	66.7	58.4	38.0	28.5	48.95	. .			39.2		47.[illegible]	
23	49	ζ Pegasi	4	. . .	28 50 47.0	52.0	64.6	55.0	37.9	27.5	47.33	. .	29.926	53.0	49.6	51.2	52.[illegible]	
	†50	α Piscis Australis, (Mic.) .	4	. . .	69 16 66.5	72.2	83.7	74.2	60.6	46.7	67.32*d*	30.186	29.926		49.4		53.[illegible]	
	51	α Pegasi	4	. . .	24 29 57.8	61.9	73.5	62.8	48.1	35.5	56.60	. .	29.926	53.2	49.2		52.[illegible]	
	52	γ Cephei	4	. . .	322 7 23.5	25.4	39.9	28.9	13.4	2.8	22.32	. .	29.926	53.0	48.7		53.1	5

DATE.	MICROMETER. Coincid.	Val. 1*r*.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Oct. 10,		62.75	Saturn .	11	0 9.01
" 16, 14*h*.	30.006				
" 17, 14*h*.	30.005		Sun . .	34	16 7.70
" 19, 14*h*.	30.009		Sun . .	36	16 9.46
			Saturn .	45	0 9.04

Oct. 16. }
Oct. 17. } Error of Runs −0″.37. Temp. of circle 50°; of stone 50°
Oct. 19. }
Oct. 23. do. .33 do. 52° do. 51°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 38.18	—1 15.29	307 23 9.71	56.38	+ 88 29 34.08	+60.50	P.
38.02	.28	9.88				
38.26	.28	9.64				
37.60	.27	10.31				
37.85	.26	10.07				
38.14	.25	9.79				
-0 38.60	.23	9.35				
-0 38.65	1 15.22	9.31				
-0 0.02	—0 35.48	328 59 50.76	55.76	+ 69 53 44.25	25.83	
0.07	+0 33.64	29 42 47.13		+ 9 10 47.88	35.41	
-0 0.14	1 19.60	53 47 28.88		— 14 53 53.87		
-0 17.87	+1 19.59					
-0 0.01	—0 0.07	359 55 49.09		+ 38 57 45.92	35.97	
0.07	+0 32.52	28 51 18.06		+ 10 2 16.95	44.79	
8.07	—1 9.74	310 24 1.36		+ 88 29 33.99	60.29	
8.22	.74	1.57				
8.07	.73	1.37				
7.34	.72	0.65				
6.85	.71	0.17				
7.58	.68	0.93				
7.55	.67	0.91				
-0 7.82	1 9.66	1.19				
-0 22.91	1 13.78	307 23 11.06	55.85	+ 88 29 36.40	57.81	
22.54	.77	.44				
22.32	.76	.67				
22.26	.75	.74				
22.48	.74	.53				
22.36	.74	.65				
22.64	.72	.39				
22.77	.71	.27				
22.51	.69	.55				
22.35	.68	.72				
22.63	—1 13.66	.46				
45.76	+0 57.07	48 11 28.22		— 9 17 53.12		
0.25	0 55.94					
2 3.52	1 0.34	48 55 11.77	56.28	— 10 1 36.24		C.
2 3.81						
2 4.07						
0 37.89	1 1.56					
39.19						
38.98						
—0 0.08	0 0.93	0 53 14.32		+ 38 0 21.21	31.15	
+0 3.55	+0 0.93	0 53 17.95		+ 38 0 17.58	30.41	
+0 0.05	—0 35.93	328 59 50.12		+ 69 53 45.43	24.11	
—0 0.07	+1 20.87	53 50 56.52		— 14 57 20.99		
+0 17.99	1 20.89					
0.17	+0 50.13	39 57 3.43		— 1 3 27.90	41.86	
0.04	—0 0.07	359 55 48.92		+ 38 57 46.61	34.67	
+0 0.05	+0 32.03	28 51 19.41	54.45	+ 10 2 14.29	44.41	
—0 10.85	2 32.64	69 19 29.11		— 30 25 55.41	56.76	
0.00	+0 26.52	24 30 23.12		+ 14 23 10.58	46.35	
+0 0.07	—0 45.29	322 6 37.10		+ 76 46 56.60	+46.98	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
October 10.		21*h*.					
179° 59′	58″0	58″8	73″8	62″5	42″4	38″3	55″63
	57.4	59.5	74.4	62.2	44.5	37.3	55.88
	57.7	59.2	74.2	62.5	43.5	37.7	55.80
P.	58.0	59.6	74.5	63.0	44.4	38.0	56.25
	57.6	59.6	74.2	62.7	43.2	37.8	55.85
	57.6	29.6	74.0	62.7	43.6	38.2	55.95
Means	57.72	59.38	74.18	62.60	43.60	37.88	55.894 —.136
October 17.		13*h*.,	40*m*.				
179 59	58.5	59.7	72.0	60.3	46.6	38.4	55.92
	57.7	60.5	73.2	60.3	48.5	37.5	56.28
	57.7	59.4	71.5	60.3	45.7	37.5	55.35
P.	57.7	60.4	72.7	61.0	48.5	37.8	56.35
	57.4	60.4	72.4	60.0	48.0	37.8	56.00
	57.4	60.4	72.4	60.0	48.0	37.8	56.00
Means	57.73	60.13	72.37	60.32	47.55	37.80	55.983 —.130
October 19.		22*h*.,	20*m*.				
179 59	54.6	63.8	74.3	65.1	46.4	34.6	56.47
	55.0	64.8	74.2	64.8	46.2	35.5	56.75
	54.8	63.2	74.1	65.0	46.6	35.1	56.47
C.	54.4	63.1	73.5	65.1	46.6	35.2	56.32
	54.3	62.9	73.3	64.2	46.0	35.3	56.00
	54.8	63.5	73.5	65.1	47.1	35.2	56.53
Means	54.65	63.55	73.82	64.88	46.48	35.15	56.422 —.138
October 23.		1*h*.,	30*m*.				
175 59	53.9	61.7	71.9	61.4	46.2	34.0	54.85
	54.2	61.1	71.8	61.1	46.4	34.1	54.78
	54.3	61.0	71.4	61.3	45.0	34.3	54.55
C.	54.7	60.5	71.3	61.3	45.1	35.1	54.67
	54.1	60.4	71.1	61.0	45.0	34.5	54.35
	53.9	60.6	71.2	60.6	45.8	33.9	54.33
Means	54.18	60.88	71.45	61.12	45.58	34.32	54.589 —.140

THERMOMETERS.

ADIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
10, No. 2	66.0	62.5	62.5
17, " 1	59.5	67.0	62.0
19, " 1	57.3	48.8	50.5
		51.8	51.5
23, " 1	51.5	52.0	52.0
		53.5	52.5

1 to 8, 36 to 47. Very unsteady.
11. Sidereal time of diameter passing, 1*s*.35, (5 wires.)
13, 48. Correction for divisions, —0″.07.
43. 61² Cygni follows 61¹ 1*s*.40, (6 wires.)
45. Sidereal time of diameter passing, 1*s*.13, (7 wires.)
50. Unsteady, large, diffused; five observations with micrometer reduced to meridian.
Nadir Point, Oct. 23. Apparent error of collimation, 6″ E.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMETERS. At.	Ext.	St.	Up.	Lo.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°	°
October 23	1	Anonymous, (Mic.)	4	. . .	39 19 46.1	51.6	62.9	52.6	36.4	27.1	46.12	30.869	29.928	53.0	47.7		52.6	52.
	†2	Anonymous, (Mic.)	4	. . .	“	“	“	“	“	“	“	26.550						
	†3	Weisse O, 246, (Mic.)	4	. . .	39 43 60.7	65.0	75.8	65.9	52.7	39.9	60.00	30.129			46.9		52.5	52.
	†4	Weisse O, 368, (Mic.)	4	. . .	40 2 20.1	24.6	36.0	27.1	12.0	0.0	19.97*d*	29.607	29.932	52.5	46.8		52.5	52.
	†5	Uranus, (Mic.)	4	. . .	34 57 45.8	51.1	61.8	52.2	34.0	25.2	45.02*d*	29.415	29.936	52.3	46.0		52.2	51.
	6	Polaris	3	−10 19.1	310 24 58.1	61.3	73.8	62.4	48.2	37.6	56.90	. .	29.930	52.0	46.0	51.5	52.0	51.
	7	(Mic.)		7 3.1								29.966						
	8	(Mic.)		6 43.1								.958						
	9	(Mic.)		6 23.1								.954						
	10	(Mic.)		6 3.1								.951						
	11	(Mic.)		5 43.1								.942						
	12			3 7.1	63.9	67.1	79.8	67.8	55.6	42.9	62.83	. .						
	13		4†	− 0 21.1	64.1	67.2	79.5	67.9	55.0	43.1	62.80	. .						
	14			+ 2 28.9	63.8	66.9	79.8	67.5	54.8	42.9	62.62	. .						
	15	(Mic.)		4 16.9								30.038						
	16	(Mic.)		4 36.9								.029						
	17	(Mic.)		4 56.9								.029						
	18	(Mic.)		5 16.9								.038						
	19	(Mic.)		5 36.9								.031						
	20		5	+ 9 12.9	58.8	62.1	74.9	62.1	48.8	28.0	57.45	. .	29.936	52.0	44.5		52.0	52.
	21	Weisse II, 120, (Mic.)	6	. . .	43 40 45.2	50.2	61.1	51.9	33.9	25.0	44.55	29.726	29.930	52.0	46.0		52.2	51.
	†22	Weisse II, 159, (Mic.)	4½	. . .	“	“	“	“	“	“	“	29.672						
	†23	Weisse II, 442, (Mic.)	4	. . .	45 11 76.5	81.4	92.6	83.2	68.3	54.3	76.06*d*	30.980					52.2	51.
	†24	Weisse II, 475, (Mic.)	4	. . .	“	“	“	“	“	“	“	29.203	29.928	51.8	45.0			
24	25	α Cephei	4	. . .	336 56 76.2	78.8	92.9	79.1	68.1	55.6	75.12*d*	. .	30.040	57.0	50.7	53.0	57.0	54.
	26	β Cephei	4	. . .	329 0 24.0	27.1	40.9	28.6	14.1	3.9	23.10	. .			48.7		55.6	54.
	†27	ε Pegasi	4	. . .	29 41 73.3	76.6	87.6	79.0	66.0	53.0	72.58*d*	. .	30.046	56.5	48.0		55.4	54.
	†28	Aquarii, 7648, (Mic.)	5	. . .	52 18 70.9	74.0	84.8	75.9	61.1	49.2	69.32	33.173						
	†29	Neptune, (Mic.)	6	. . .	“	“	“	“	“	“	“	23.763	30.048	55.8	47.6		53.5	53.
25	†30	Aquarii, 7648, (Mic.)	4	. . .	52 16 67.5	70.5	81.8	73.0	57.9	46.8	66.25*d*	31.230				51.0	51.7	50.
	†31	Neptune, (Mic.)	4	. . .	52 25 38.0	41.5	55.1	45.6	29.6	18.9	38.12	29.857	30.362	52.5	43.2		51.6	
26	32	61¹ Cygni	4	. . .	0 52 72.9	75.4	87.1	76.6	64.9	52.0	71.48	. .	30.308	55.5	50.5	51.0	56.5	53.
	†33	61² Cygni, (Mic.)	4	. . .	“	“	“	“	“	“	“	29.968						
	†34	α Cephei, Ref., (Mic.)	3¾	− 0 13.2	203 2 31.0	33.0	44.5	36.5	18.0	10.4	28.90*d*	29.900	30.305	55.5	52.2			
	35	α Cephei	5	+ 0 33.8	336 56 75.0	77.3	91.0	78.5	67.1	53.8	73.78*d*	. .					55.7	53.
	36	β Cephei	4	. . .	329 0 22.4	25.9	39.1	27.0	13.0	0.4	21.30	. .	30.302		52.0		55.2	53.
	37	ε Pegasi	4	. . .	29 41 72.9	75.3	86.2	78.7	65.2	51.8	71.68*d*	. .	30.302	55.5	51.8		55.0	53.
	†38	Aquarii, 7648, (Mic.)	4	. . .	52 15 41.7	45.7	57.9	49.9	31.0	24.0	41.70	29.882	30.298	55.2	50.8		54.7	53.
28	†39	Aquarii, 7648, (Mic.)	3¼	. . .	52 15 19.6	25.8	36.1	28.5	12.3	3.2	20.92	29.554	30.052	54.5		56.5	49.6	50.
	†40	Neptune, (Mic.)	4½	. . .	52 25 56.0	62.2	74.2	63.9	48.3	39.0	57.27	29.856			43.9			
	†41	Weisse XXI, 1223, (Mic.)	5	. . .	“	“	“	“	“	“	“	28.809						
	†42	Lacertæ, 7765, (Mic.)	4	. . .	359 55 51.7	57.0	68.1	59.6	42.4	33.3	52.02	. .	30.050	53.5	44.1		49.3	47.
	43	Polaris	3	− 9 26.3	310 24 56.6	63.1	73.3	63.0	47.8	36.3	56.68	. .	30.068	48.5	40.0	55.8	45.5	48.
	44	(Mic.)		6 54.3								29.960						
	45	(Mic.)		6 34.3								.972						
	46	(Mic.)		6 14.3								.950						
	47	(Mic.)		5 54.3								.941						
	48	(Mic.)		5 34.3								.941						
	49			3 40.3	62.0	68.8	78.9	68.2	53.6	42.9	62.40	. .						
	50		4	− 0 37.3	61.6	68.2	78.8	68.0	54.2	42.2	62.17	. .			40.0			
	51			+ 2 14.7	62.1	68.9	79.1	69.0	54.2	42.9	62.70	. .						
	52	(Mic.)		+ 3 45.7								30.040						

DATE.	MICROMETER. Coincid.	Val. 1 r.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			
Oct. 24, 22*h*.	30.010	62.75			
“ 25, 22*h*.	30.009				
“ 26, 22*h*.	30.010				
“ 28, 23*h*.	30.011				

Oct. 24.
Oct. 25. } Error of Runs —0″.37. Temp. of circle 50°; of stone 50°
Oct. 26.
Oct. 28. do. .77 do. 47° do. 56°
Oct. 26, 21*h*. Zenith Point, by observations of α Cephei, 359°50′ 55.″00.
Oct. 28. Thermometer No. 2, (vide App. 1845, pp. 85–98,) substituted for the external thermometer heretofore used.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		350° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 53.95	+0 47.77	39 19 39.94	54.45	— 0 26 6.24	+53.98	C.
3 37.30	0 47.85	39 24 11.27		— 0 30 37.57	54.19	
0 7.45	0 48.56	39 44 41.11		— 0 51 7.41	54.63	
0 25.32	0 49.12	40 3 34.41		— 1 10 0.71	54.79	
37.60	+0 40.72	34 59 3.34		+ 3 54 30.36		
5.48	—1 8.67	310 23 53.71				
5.25	.70	53.45				
5.52	.70	53.72				
5.54	.71	53.73				
5.52	.71	53.71				
5.87	.72	54.05				
0.50	.74	54.59				
0.01	.77	54.04		+ 88 29 39.89	55.49	
0 0.28	.80	54.10				
0 0.75	.82	53.05				
0 0.03	.83	53.76				
0 0.13	.84	53.91				
0 0.26	.84	53.52				
0 0.36	.85	54.13				
4.38	—1 8.88	52.95				
17.96	+0 55.87	43 41 58.38		— 4 48 24.68	49.07	
0 21.31	0 55.87	43 42 1.73		— 4 48 28.03	48.78	
1 0.79	0 58.94	45 12 14.21		— 6 18 40.51	46.69	
0 50.81	+0 59.01	45 14 5.88		— 6 20 32.18	46.48	
0.08	—0 24.78	336 56 50.42	54.75	+ 61 56 43.58	21.07	
0.02	0 35.11	328 59 48.01		+ 69 53 45.99	23.32	
0 0.08	+0 33.39	29 42 45.95		+ 9 10 48.05	35.21	
3 18.30	1 15.59	52 17 6.61		— 13 23 32.61	44.58	
6 32.07	1 15.81	52 26 57.20		— 13 33 23.20		
1 16.42	1 17.04	52 17 6.87	54.25	— 13 23 33.37	44.64	
0 9.54	1 17.28	52 27 4.94		— 13 33 31.41		
0 0.06	0 0.91	0 53 12.33	53.71	+ 38 0 20.63	30.73	
0 2.58	0 0.91	0 53 14.97		+ 38 0 17.99	29.99	
6.97	+0 24.93	203 3 0.80		+ 61 56 46.34	20.85	
0.35	—0 24.93	336 56 49.20		+ 61 56 43.76	20.85	
0.01	—0 35.20	328 59 46.11		+ 69 53 46.85	23.04	
0.08	+0 33.45	29 42 45.21		+ 9 10 47.75	35.22	
7.98	1 15.77	52 17 5.45		— 13 23 32.49	44.70	
28.74	1 16.21	52 17 5.87	54.27	— 13 23 32.35	44.83	
9.79	1 16.46	52 27 23.52		— 13 33 50.00		
1 15.63	+1 16.73	52 28 29.63		— 13 34 56.11	45.24	
0 6.73	—0 0.07	359 55 45.22		+ 38 57 48.30	33.68	
0 4.59	1 9.89	310 23 51.38				
5.56	.89	52.35				
4.59	.89	51.38				
5.75	.89	52.54				
6.10	.89	52.89				
5.89	.89	52.68				
0.69	.88	53.21				
0.02	.88	52.31		+ 88 29 41.12	+53.50	
0 0.27	.88	53.09				
0 1.00	.88	51.82				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
October 24.		21*h*.					
179° 59′	57″0	59″3	72″6	60″5	45″2	36″3	55″15
	56.2	59.2	72.0	60.0	44.8	35.6	54.63
	56.5	59.9	72.3	60.1	45.9	35.7	55.07
C.	56.0	59.7	72.3	60.1	45.2	35.6	54.82
	55.7	59.8	71.7	60.0	45.3	35.9	54.73
	55.9	59.9	71.8	60.4	45.7	35.6	54.88
Means	56.22	59.63	72.12	60.18	45.35	35.78	54.880 —.128
October 25.		21*h*.,	30*m*.				
179 59	56.0	59.2	71.2	61.6	43.2	35.7	54.48
	54.5	59.0	71.9	60.2	44.1	34.2	53.98
	55.0	59.7	71.9	60.4	44.1	35.0	54.35
C.	55.0	59.9	71.9	60.9	44.2	34.9	54.47
	55.0	59.9	71.3	60.9	44.2	34.7	54.33
	55.2	60.1	72.0	61.1	44.6	34.9	54.65
Means	55.12	59.63	71.70	60.85	44.07	34.90	54.378 —.131
October 26.		20*h*.,	40*m*.				
179 59	55.7	58.0	70.2	60.1	43.0	35.7	53.78
	55.2	58.7	70.7	59.3	44.0	34.9	53.80
	54.9	58.9	70.9	59.8	44.2	34.2	53.82
C.	55.0	59.0	70.8	60.1	44.5	34.2	53.93
	54.9	58.9	70.9	60.0	44.3	34.2	53.87
	54.7	59.1	70.9	60.0	44.1	34.2	53.83
Means	55.07	58.77	70.73	59.88	44.02	34.57	53.839 —.130
October 28.		22*h*.,	20*m*.				
179 59	52.2	61.6	70.1	61.2	44.5	35.1	54.12
	53.1	61.7	69.9	62.2	44.1	36.3	54.55
	53.1	61.7	69.8	62.2	43.2	36.0	54.33
C.	53.0	61.1	69.4	62.1	43.1	36.0	54.12
	52.9	62.2	70.2	62.1	45.1	35.7	54.70
	52.9	62.0	69.9	62.7	44.2	36.1	54.63
Means	52.87	61.72	69.88	62.08	44.03	35.87	54.408 —.141

THERMOMETERS.

R POINTS.	Stone.	Upper.	Lower.
	°	°	°
24, No. 1	53.0	57.0	54.5
		57.5	55.0
25, “ 1	51.0	57.5	52.4
		55.0	52.0
26, “ 1	51.0	55.7	53.0
		56.5	53.2
28, “ 1	56.5	48.9	50.4
		54.8	53.5

		H.	M.	S.		
1.	App. R. A.	23	54	17	(9	mag.)
2.	“	23	59	19	(10	“)
3.	“	0	14	2	(8	“)
4.	“	0	22	2	(7.8	“)
21.	“	2	8	17	(8.9	“)
22.	“	2	10	36	(8.9	“)
23.	“	2	26	32	(8.9	“)
24.	“	2	27	57	(9	“)
41.	“	21	52	10	(9	“)

2. Extremely faint ; observation very doubtful.
3, 22, 29, 41. Two obs. with mic. reduced to meridian.
4, 5, 24, 28, 31. Three obs. with mic. reduced to meridian.
23, 38, 39, 40. Four obs. with mic. reduced to meridian.
23. Double; observed the Sn. of the two.
29, 31, 40. Cor. applied for parallax, —0″.23.
30, 42. Five obs. with mic. reduced to meridian.
27. Very unsteady.
33. 61^2 Cygni follows 61^1 1s.58, (6 wires.)
34. Mercury at times very unsteady.
42. Correction for divisions, —0″.07.
Nadir Points, Oct. 24 & 25. Apparent error of collimation, 9″ E.

No.	Star			READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMETERS				
						A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.	L
			s.	°	'	"	"	"	"	"	"	"	Revs.	In.	°	°	°	°	
			−4 5.7										30.032						
			4 25.7										.032						
			4 45.7										.041						
			5 5.7										.045						
			−7 11.7	310	24	58.1	65.9	75.6	65.2	50.4	39.8	59.17	. .	30.066	48.1	40.1		45.2	47.
			. . . .	0	52	71.6	75.9	86.1	78.6	63.7	51.6	71.25	. .	30.168	54.2	46.6		53.4	52.
		4	. . .			"	"	"	"	"	"	"	29.951						
		4	. . .	9	16	56.5	61.3	71.2	62.9	45.8	35.6	55.55d	. .			47.9		53.1	52.
		4	. . .	336	56	73.9	76.6	89.8	78.0	65.8	53.0	72.85d	. .	30.164	54.2	48.5		53.1	52.
		4	. . .	45	6	54.6	59.0	69.8	61.0	43.1	34.0	53.58d	. .			47.3	52.6	53.2	52.
		4	. . .	29	41	72.3	75.8	86.6	78.7	64.2	51.7	71.55d	. .	30.164	53.8	46.2		52.9	52.
		3	. . .	52	14	63.9	69.3	79.3	71.9	54.9	46.0	64.22	29.269						
		4	. . .	52	25	61.1	65.0	77.2	68.7	51.0	42.2	60.87	29.809					52.5	52.
		5	. . .			"	"	"	"	"	"	"	28.803	30.158	52.5	45.0			
		4	. . .	359	55	38.4	42.9	51.8	47.7	27.9	19.1	38.47	29.889	30.158	52.2	43.5		51.7	51.
		1	−0 44.6	44	32	26.8	31.0	41.9	34.3	16.0	5.9	25.98d	. .	30.160	51.0	43.3		52.2	51.
	(Mic.)	2	0 30.2			"	"	"	"	"	"	"	30.065						
	(Mic.)	3	−0 13.9			"	"	"	"	"	"	"	.102						
	(Mic.)	4	+0 1.5			"	"	"	"	"	"	"	.166						
	(Mic.)	5	0 16.0			"	"	"	"	"	"	"	.231						
	(Mic.)	6	0 30.4			"	"	"	"	"	"	"	.270						
	(Mic.)	7	+0 45.8			"	"	"	"	"	"	"	.311						
	(Mic.)	4	. . .	69	16	62.2	69.0	78.7	71.5	54.6	43.9	63.32	30.188	30.164	50.5	43.0	52.7	50.5	50.
	64S, (Mic.)	4	. . .	52	14	72.5	72.8	87.5	77.2	62.5	52.7	70.87	29.326	30.126	68.0	61.0	68.0	66.0	65.
	XXI, 1240, (Mic.)	5	. . .	52	41	33.6	33.5	49.0	37.8	20.6	12.8	31.22	33.820	30.128	67.5	60.5		65.0	65.
		4	. . .	28	50	46.7	48.8	64.0	54.0	35.5	27.5	46.08	. .	30.126	66.0	59.0		63.5	64.
	Australis	4	. . .	69	16	60.4	63.7	77.0	66.9	50.7	40.7	59.91d	. .	30.122	65.5	58.0			64.
		5	. . .	24	29	58.3	58.5	73.4	60.8	46.4	36.2	55.60	. .						
		4	. . .	322	6	80.6	80.0	97.7	84.2	70.3	59.4	78.70d	. .	30.126	65.0	57.3		64.0	64.
	Andromedæ	4	. . .	10	38	28.0	30.8	45.2	33.2	17.6	7.6	27.07	. .	30.126	64.2	57.2			
	Pegasi	4	. . .	24	32	61.3	62.3	75.3	64.9	48.3	38.2	58.39d	. .	30.126	64.2	57.1		64.5	63.
	Cassiopeæ	4	. . .	343	11	47.2	48.2	65.8	51.0	35.6	29.3	46.18	. .	30.130	63.7	57.0		63.5	63.
		5	−9 21.0	307	44	65.8	72.0	86.3	71.4	59.2	45.6	66.72	30.361	30.174	49.6	47.5	56.5		59.
			7 21.0										.390						
			5 21.0										.408						
			3 21.0										.415						
			−1 21.0										.422						
	Polaris, S. P., (Mic.)	4	+0 28.0										.434						
			2 28.0										.434						
40			4 28.0										.414						
41			6 28.0										.404						
42			8 28.0										.369						
43		3	+10 14.0										.331	30.174	49.6	48.6		51.5	
44	Sun, N. L., (Mic.)	3	−0 16.0	57	34	60.6	68.3	81.6	68.3	54.5	43.3	62.60	22.178	30.152	54.0	54.5		57.3	57.
45	Sun, S. L.	5	+0 15.0	58	15	32.4	39.4	53.8	40.8	24.4	14.6	34.23	. .						
46	ζ Pegasi	4	. . .	29	10	46.0	52.0	66.0	54.7	38.3	27.2	47.37	. .	30.180	54.8	47.2	56.0	53.0	53.
47	α Piscis Australis	4	. . .	69	36	53.0	60.2	74.8	63.0	46.3	35.7	55.50	. .	30.180	54.5	46.8		52.5	53.
48	α Pegasi	4	. . .	24	49	57.5	62.2	74.5	63.0	45.2	35.4	56.30	. .		54.2	47.0		51.5	53.
49	1860, Gooombridge, S. P.	4	. . .	303	35	64.0	67.0	81.6	71.0	53.7	43.0	63.38	. .	30.184	53.3	47.0			
50	Ursæ Minoris, 4166, S. P.	4	. . .	303	27	74.6	79.3	93.7	82.8	65.6	53.7	74.95	. .						
51	Ursæ Minoris, 4193, S. P.	4	. . .	303	31	26.0	30.5	45.5	35.2	16.3	5.5	26.50	. .	30.184	53.0	47.0		51.5	52.
52	Polaris, (Mic.)	3	−10 2.7	310	44	61.7	66.3	80.4	66.8	51.4	40.0	61.10	30.173	30.194	52.0	46.1			

	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1r.	Objects.	No.	Semi-diam.
	revs.	"			' "
Oct. 29, 23h.	30.009	62.75			
Nov. 9, 22h.	30.007				
" 15, 13h.	30.011				
" 16.			Sun. . .	44	16 10.97

Oct. 29. Error of Runs —0″.20. Temp of circle 52° ; of stone 52°
Nov. 9. do. +0.03 do. 64° do. 68°
Nov. 16. do. —0.04 do. 60° do. 60°
Nov. 14. Moved telescope forward 20′.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
nstrument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
-0 0.37	— 1 9.88	310 23 52.45				C.
0.23	.88	52.59				
0.63	.88	52.19				
-0 0.71	.88	52.11				
+0 2.67	— 1 9.87	51.97				
-0 0.02	+ 0 0.91	0 53 12.14	53.95	+ 38 0 21.06	+30.62	
+0 3.58	0 0.91	0 53 15.74		+ 38 0 17.46	29.88	
0.08	+ 0 9.62	9 17 5.25		+ 29 36 27.95	23.35	
0.07	— 0 25.00	336 56 47.92		+ 61 56 45.28	20.57	
0.07	+ 0 59.09	45 7 52.74		— 6 14 19.54	37.78	
0.07	0 33.83	29 42 45.45		+ 9 10 47.75	35.25	
46.60	1 16.33	52 17 7.15		— 13 23 33.95	44.90	
12.57	1 16.57	52 27 30.01		— 13 33 56.81		
1 15.89	+ 1 16.85	52 28 33.61		— 13 35 0.41	45.29	
+0 7.47	— 0 0.07	359 55 45.87		+ 38 57 47.33	33.59	
-0 8.85	—56 56.91	43 35 19.60		— 4 41 46.40		
9.60						
8.55						
9.38						
10.47						
9.98						
9.45						
-0 11.21	+ 2 35.91	69 19 28.02		— 30 25 54.82	57.57	
-0 42.92	1 13.81	52 17 7.60	54.35	— 13 23 34.00	45.61	P.
-3 58.22	1 14.85	52 38 47.85		— 13 45 14.25	46.20	
0.00	0 31.64	28 51 17.72		+ 10 2 15.68	44.49	
-0 0.09	2 30.93	69 19 30.93		— 30 25 57.33	58.95	
0.07	+ 0 26.23	24 30 21.90		+ 14 23 11.70	46.06	
0.08	— 0 44.81	322 6 33.97		+ 76 46 59.63	42.34	
0.04	+ 0 10.84	10 38 37.95		+ 28 14 55.65	47.98	
0.09	+ 0 26.34	24 33 24.82		+ 14 20 8.78	51.54	
-0 0.03	— 0 17.42	343 11 28.79		+ 45 42 4.81	46.89	
-0 26.19	1 16.90	307 43 23.63	0° 19′ 56″.40	+ 88 29 48.11	47.25	
26.31	.88	23.53				
26.17	.87	23.68				
25.73	.85	24.14				
25.70	.84	24.18				
26.39	.82	23.51				
26.72	.80	23.20				
26.19	.79	23.74				
26.72	.77	23.23				
26.07	.75	23.90				
-0 25.36	— 1 16.73	24.63				
-8 11.49	+ 1 23.22	58 0 48.28		— 18 47 12.63		
-0 0.04	1 25.07					
-0 0.04	0 32.46	29 11 19.87	55.91	+ 10 2 15.29	44.71	
0.16	2 34.74	69 39 30.40		— 30 25 55.24	59.71	
0.00	+ 0 26.88	24 50 23.18		+ 14 23 11.98	+46.16	
-0 0.09	— 1 29.68	303 34 33.79		+ 84 20 58.63	—44.55	
-0 0.10	1 30.13	303 26 44.72		+ 84 13 9.56	45.11	
-0 0.14	1 29.94	303 29 56.70		+ 84 16 21.54	—45.38	
-0 4.97	— 1 9.33	310 43 46.89				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
October 29.		22*h*.,	40*m*.				
179° 59′	54″1	60″2	71″0	62″0	44″2	35″0	54″42
	53.5	59.9	70.1	60.9	43.6	34.5	53.75
	54.6	60.0	70.0	62.2	43.6	35.9	54.38
C.	53.9	60.0	69.9	62.1	43.1	35.0	54.00
	53.9	59.8	70.0	61.9	43.0	35.0	53.93
	53.8	60.0	70.1	62.0	43.1	35.2	54.03
Means	53.97	59.98	70.18	61.85	43.43	35.10	54.086 —.135
November 9.		23*h*.					
179 59	56.5	57.5	71.8	60.7	42.3	37.3	54.35
	55.8	57.8	72.2	59.8	43.4	36.0	54.17
	56.5	57.8	72.2	61.2	42.4	37.5	54.60
P.	55.5	59.3	73.0	60.3	45.0	35.8	54.82
	56.0	58.2	71.8	61.0	42.6	36.8	54.40
	55.8	58.8	72.0	60.6	43.5	36.6	54.55
Means	56.02	58.23	72.17	60.60	43.20	36.67	54.480 —.135
November 16.		15*h*.,	50*m*.				
180 19	56.0	61.3	74.3	62.4	45.0	37.0	56.00
	55.5	62.6	75.4	62.0	47.6	35.7	56.47
	56.3	62.5	75.0	62.3	46.4	36.3	56.47
P.	56.3	62.5	75.0	62.3	46.4	36.3	56.47
	56.3	62.5	75.0	62.3	46.4	36.3	56.47
	56.3	62.5	75.0	62.3	46.4	36.3	56.47
Means	56.12	62.32	74.95	62.27	46.37	36.32	56.390 +.009
November 16.		23*h*.					
180 19	55.4	61.5	73.8	63.0	44.8	36.7	55.87
	55.0	62.3	75.0	62.3	47.3	35.2	56.18
	55.0	61.5	73.4	63.2	43.8	35.8	55.45
P.	54.5	62.2	74.3	62.4	46.0	35.2	55.77
	55.2	62.2	74.0	63.0	45.2	36.0	55.93
	55.3	62.2	74.5	63.3	46.2	36.0	56.25
Means	55.07	61.98	74.17	62.87	45.55	35.82	55.908 +.007

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
29, No. 1	52.7	51.1	51.4
		51.1	51.4
9, " 1	68.0	66.0	66.5
16, " 1	56.5	57.7	57.3
" 2	56.0	54.5	54.5

		H. M. S.	
14.	App. R. A.	21 52 11	(9 mag.)
25.	"	21 52 51	(7 ") faint.
49.	"	12 6 53	(7 ")

7. 61^2 Cygni follows 61^1 1*s*.65 (4 wires.)
13. Cor. applied for parallax, —0″.23.
15. Correction for divisions, —0″.07.
12. Four obs. with mic. reduced to meridian.
13, 15. Three obs. with mic. reduced to meridian.
14. Two obs. with mic. reduced to meridian.
23. Five obs. with mic. reduced to meridian.
23 to 32. Very unsteady.
27, 32, 48. Partially obscured.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMETE			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
November 16	1			− 8 2.7								30.133					
	2			6 2.7								.115					
	3			4 2.7								.081					
	4			2 2.7								.077					
	5	Polaris, (Mic.)	4	− 0 15.7								.068					
	6			+ 1 44.3								.080					
	7			3 44.3								.097					
	8			5 44.3								.113					
	9			7 44.3								.127					
	10		5	+ 9 33.3	310 44 61.7	66.3	79.8	67.7	51.7	40.5	61.28	.148	30.190	52.0	45.5		
19	†11			− 2 46.8								30.075					
	12			− 1 16.8								.080					
	13		4	+ 0 7.2								.080	29.816	54.5	51.0		
	14	Polaris, S. P., (Mic.) . .		2 7.2								.070					
	15			4 7.2								.067					
	16			6 7.2								.038					
	17			8 7.2								.025					
	†18		3	+ 9 58.2	307 24 53.7	59.3	72.4	58.7	44.0	36.2	54.05	.000	29.816	54.5	51.0	56.0	55.0
20	19	Ursæ Minoris, 4166, S. P.	4	. . .	303 8 22.3	27.4	40.4	30.0	13.4	3.0	22.75	. .	29.984	53.0	41.5		51.0
	20	Ursæ Minoris, 4193, S. P.	4	. . .	303 11 35.0	40.0	53.4	44.0	23.8	15.7	35.32	. .					
21	21	Aquarii, 7648, (Mic.) .	7	. . .	52 15 24.1	31.1	42.4	35.9	16.4	7.0	26.15	29.435	29.978	53.5	42.1	52.3	54.2
	†22	Neptune	4	. . .	52 24 76.0	83.0	94.3	87.0	69.4	58.1	77.97	. .			41.9		52.0
	†23	Weisse, XXI, 1223, (Mic.)	5	. . .	“	“	“	“	“	“	“	27.955					
	†24	Lacertæ, 7765	4	. . .	359 55 53.7	59.8	71.9	63.0	45.1	33.6	54.52	. .	29.974	52.8	42.5		50.2
	25	ζ Pegasi	4	. . .	28 50 52.6	60.0	71.9	64.9	45.0	34.6	54.83	. .	29.962	51.0	41.5		49.5
	†26	α Piscis Australis, (Mic.) .	4	. . .	69 17 23.8	33.8	44.0	37.4	18.0	6.9	27.32*d*	30.352	29.960	50.2	42.3	55.3	49.8
23	†27	Aquarii, 7648, (Mic.) .	4	. . .	52 14 66.7	73.5	83.6	77.5	59.0	49.6	68.32	29.163			40.9		54.5
	†28	Neptune, (Mic.) . . .	3½	. . .	52 24 47.9	55.8	67.2	58.0	39.9	31.6	50.07	29.924	30.030	53.5	41.1	53.2	50.0
24	†29		1	− 0 49.8	59 44 51.3	60.4	70.2	60.2	43.0	36.1	53.53	30.725	29.818	47.5	48.6	50.0	50.8
	30	Sun, S. L., (Mic.) . .	2	0 33.8	“	“	“	“	“	“	“	.741					
	31		3	− 0 17.8	“	“	“	“	“	“	“	.721					
	32		4†	+ 0 11.2	59 10 71.2	80.9	89.9	81.9	65.9	56.0	74.30	29.602			49.3		51.0
	33	Sun, N. L., (Mic.) . .	5†	0 23.2	“	“	“	“	“	“	“	.574					
	34		6†	0 36.2	“	“	“	“	“	“	“	.588					
	†35		7	+ 0 49.2	“	“	“	“	“	“	“	.608					
28	†36		1	− 0 50.0	60 29 46.0	56.0	64.9	55.9	37.0	28.1	47.98	30.481	30.024	45.0	55.0	45.2	48.0
	37	Sun, S. L., (Mic.) . .	3	− 0 14.0	“	“	“	“	“	“	“	.491					
	38		4	00.0	“	“	“	“	“	“	“	.486					
	†39		5†	+ 0 23.0	59 56 19.2	28.2	38.7	31.0	12.8	1.3	21.87	29.551					48.7
	40	Sun, N. L., (Mic.) . .	6†	0 36.0	“	“	“	“	“	“	“	.547					
	†41		7	+ 0 50.0	“	“	“	“	“	“	“	.557					
30	†42		1	− 0 49.6	60 17 26.9	35.2	44.8	36.6	18.1	9.2	28.47*d*	30.492	30.318	51.8	43.9	50.0	51.9
	43	Sun, N. L., (Mic.) . .	2	0 32.6	“	“	“	“	“	“	“	.501					
	44		3	− 0 17.6	“	“	“	“	“	“	“	.531					
	45		4†	+ 0 5.4	60 48 61.5	69.5	78.4	69.8	53.5	44.1	62.80	29.582					52.0
	46	Sun, S. L., (Mic.) . .	5	0 16.4	“	“	“	“	“	“	“	.579					
	47		6	0 34.4	“	“	“	“	“	“	“	.576					
	†48		7	+ 0 50.4	“	“	“	“	“	“	“	.596					
	†49	Lacertæ, 7765	4	. . .	359 55 52.5	60.7	71.8	62.8	45.8	34.0	54.60	. .	30.294	49.7	41.0	50.2	45.2
	50	ζ Pegasi		. . .	28 50 50.4	60.1	71.2	62.0	45.3	33.0	53.67	. .	30.290	48.5	40.7		43.8
	†51	α Piscis Australis, (Mic.) .	4	. . .	69 17 29.5	41.4	51.4	43.2	24.7	13.0	33.87*d*	30.503	30.296		40.0		43.9
	†52	α Ursæ Majoris, S. P. . .	4†	+ 0 16.5	281 32 41.2	49.5	59.5	50.8	30.8	23.0	42.47*d*	. .	30.296	47.0	40.0		44.0

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r*.	Objects.	No.	Semi-diam.
	rers.	″			′ ″
Nov. 19, 13*h*.	29.992	62.75			
“ 21, 23*h*.	29.989				
“ 23, 22*h*.	29.987				
“ 24, 16*h*.	29.990		Sun . .	29	16 15.00
“ 28, 17*h*.	29.989		Sun . .	36	16 15.05
“ 30, 17*h*.	29.986		Sun . .	42	16 17.14

Nov. 20. Error of Runs —0″.19. Temp. of circle 56°: of stone 56°
Nov. 21. do. .23 do. 54° do. 54°
Nov. 23.
Nov. 24. do. .35 do. 50° do. 50°
Nov. 28.
Nov. 30. do. .66 do. 46° do. 50°
Nov. 17. Moved telescope back 20′, adjusted level and collimation, and the micrometer wire to parallelism with the fixed wire.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
nstrument.	Objects.		0° 19′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
—0 4.33	—1 9.33	310 43 47.53	55.91	+ 88 29 47.52	+47.11	P.
4.65	.34	47.20				
3.55	.34	48.30				
3.91	.35	47.93				
3.53	.36	48.30				
4.13	.37	47.69				
4.60	.38	47.21				
4.60	.38	47.21				
4.04	.39	47.76				
3.72	1 9.40	48.07				
5.55	1 15.44	307 23 33.06	359° 59′ 64″.55	+ 88 29 49.42	+46.00	
5.55	.44	33.06				
5.48	.44	33.13				
5.09	.44	33.52				
5.55	.44	33.06				
4.81	.44	33.80				
5.48	.44	33.13				
5.64	1 15.44	32.97				
—0 0.12	1 30.52	303 6 52.11		+ 84 13 8.31	—43.97	
+0 0.18	—1 30.33	303 10 5.17		+ 84 16 21.37	—44.25	
34.75	+1 16.30	52 17 17.20	64.56	— 13 23 33.39	+46.37	C.
0.02	1 16.53	52 26 34.52		— 13 32 50.71		
2 7.51	+1 16.86	52 28 42.34		— 13 34 58.53	46.78	
0 0.00	—0 0.07	359 55 54.45		+ 38 57 49.36	32.79	
+0 0.08	+0 32.61	28 51 27.52		+ 10 2 16.29	44.93	
—0 22.60	2 35.07	69 19 39.79		— 30 25 55.98	60.21	
+0 51.79	1 16.62	52 17 16.73	63.91	— 13 23 33.57	46.50	
+0 3.88	1 16.77	52 26 10.72		— 13 32 27.56		
—0 46.45	+1 31.71	59 29 23.72		— 20 35 40.46		
47.23						
—0 45.87						
+0 24.44	1 29.64					
26.13						
25.10						
+0 23.45						
—0 30.81	1 34.21	60 14 36.19	63.10	— 21 20 53.84		
31.17						
—0 30.87						
+0 27.45	1 32.09					
27.51						
+0 26.59						
—0 31.81	1 36.56	60 34 49.54	62.92	— 21 41 7.37		
32.17						
—0 33.99						
+0 25.39	+1 38.83					
25.50						
25.45						
23.87						
0.04	—0 0.07	359 55 53.57		+ 38 57 48.60	33.15	
—0 0.12	+0 33.02	28 51 26.81		+ 10 2 15.36	45.45	
—0 32.16	+2 37.57	69 19 39.28		— 30 25 57.11	+60.90	
—0 0.06	—4 46.49	281 27 56.04		+ 62 34 13.87	—38.03	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
November 20.		23h.					
179° 59′	63″6	70″8	82″0	71″8	55″7	45″3	64″87
	63.0	72.1	82.4	70.3	57.8	43.0	64.77
	63.0	70.6	81.0	70.6	55.0	43.7	63.98
P.	63.0	71.8	82.3	70.6	58.0	42.8	64.75
	63.3	71.8	82.0	71.0	56.8	44.2	64.85
	63.3	71.8	82.2	71.0	57.8	43.0	64.85
Means	63.20	71.48	81.98	70.88	56.85	43.67	64.678 —.131
November 21.		23h.					
179 59	62.4	71.0	81.2	73.0	54.5	43.9	64.33
	62.8	71.3	81.8	74.0	55.5	44.3	64.95
	63.0	71.2	81.8	73.3	55.1	44.6	64.83
C.	63.0	71.9	82.1	73.9	55.3	44.2	65.07
	62.2	71.0	81.7	72.9	55.9	43.2	64.48
	62.2	71.0	81.8	73.0	54.9	43.9	64.47
Means	62.60	71.23	81.73	73.35	55.20	44.02	64.689 —.129
November 23.		22h.,	20m.				
179 59	62.6	69.7	79.9	72.9	53.3	45.3	63.95
	62.9	70.0	79.9	72.5	53.8	44.2	63.88
	62.6	70.1	80.8	72.1	54.4	44.0	64.00
C.	62.7	70.2	80.1	73.0	54.9	44.2	64.18
	62.6	70.5	80.1	72.6	54.9	44.1	64.13
	62.6	70.2	80.2	72.4	54.8	44.4	64.10
Means	62.67	70.12	80.17	72.58	54.35	44.37	64.042 —.130
November 30.		23h.					
179 59	61.0	71.0	79.9	71.9	53.3	42.1	63.20
	60.6	71.8	80.0	71.7	54.0	41.3	63.23
	60.1	71.2	79.9	71.6	53.9	41.4	63.02
C.	60.0	71.1	80.1	71.2	53.2	41.0	62.77
	60.0	70.9	80.1	71.6	53.9	41.5	63.00
	60.4	71.1	80.1	71.7	54.0	41.2	63.08
Means	60.35	71.18	80.02	71.62	53.72	41.42	63.050 —.126

THERMOMETERS.

IR POINTS.		Stone.	Upper.	Lower.
		°	°	°
20,	No. 2	56.0	57.5	55.0
21,	" 1	53.3	51.0	50.0
			52.5	51.5
23,	" 1	53.2	53.2	52.4
			54.0	53.0
30,	" 1	50.1	44.7	45.5
			46.5	46.2

11 to 18. Passing clouds.
22, 28. Cor. applied for parallax, —0″.23.
23. Apparent R. A. 21*h*., 52*m*., 16*s*., (9 mag.)
24, 39, 49. Correction for divisions, —0″.07.
26, 29 to 35, 42 to 48, 52. Very unsteady.
26, 51. Five obs. with mic. reduced to the meridian; star diffused and large.
27. Three obs. with mic. reduced to the meridian.
28. Four obs. with mic. reduced to the meridian.
28, 36 to 41. Nearly obscured.
29. Correction for divisions, 0″.00.
29 to 35. Zenith Point doubtful.
36. Correction for divisions, +0″.20.
42. Correction for divisions, —0″.03.

APPARENT DECLINATIONS—MURAL CIRCLE.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMETERS. At.	Ext.	St.	Up.	Lo.
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°	°
November 30	†1	γ Cephei	4	. . .	322 7 22.7	30.5	42.4	32.4	15.3	3.8	24.52*d*	. .	30.300	45.2	38.1	50.1	46.5	46.2
	2	α Andromedæ	4	. . .	10 38 29.8	41.2	50.7	42.2	24.2	11.0	33.18	. .	30.304	42.7	36.4		43.8	44.5
	3	Weisse O, 246	4	. . .	39 43 57.0	69.0	76.0	68.8	52.9	40.6	60.72	. .	30.306		36.3		40.5	42.7
	†4	Weisse O, 425, (Mic.) .	4½	. . .	40 9 62.9	74.2	82.0	75.0	58.4	45.8	66.38	29.909			35.4		40.0	42.5
	†5	Weisse O, 479, (Mic.) .	4	. . .	40 13 41.8	54.1	62.3	54.5	35.2	25.0	45.48	30.171					39.9	42.3
	†6	Ceti, 163, (Mic.) . . .	4	. . .	"	"	"	"	"	"	"	30.247						
	†7	Weisse O, 712, (Mic.) .	4	. . .	"	"	"	"	"	"	"	31.469			35.0			
	†8	Weisse O, 762, (Mic.) .	4	. . .	"	"	"	"	"	"	"	28.863						
	†9	Weisse O, 772, (Mic.) .	7	. . .	"	"	"	"	"	"	"	31.710	30.314	43.0	35.0			
	10		3	− 9 51.6	310 24 55.1	65.1	75.2	63.6	49.0	35.2	57.20	. .	30.310	42.5	35.0	50.0	40.5	41.5
	11	(Mic.)		7 36.6								29.948						
	12	(Mic.)		7 16.6								.934						
	13	(Mic.)		6 56.6								.949						
	14	(Mic.)		6 36.6								.950						
	15	(Mic.)		6 16.6								.934						
	16			4 1.6	58.8	69.4	78.4	68.2	53.6	39.1	61.25	. .						
	17	Polaris	4	− 0 8.6	59.0	69.7	78.9	68.5	53.9	39.1	61.52	. .			34.9		41.5	41.7
	18			+ 3 34.4	60.6	71.4	80.3	70.8	55.9	41.0	63.33	. .						
	19	(Mic.)		5 38.4								30.018						
	20	(Mic.)		5 58.4								.037						
	21	(Mic.)		6 18.4								.037						
	22	(Mic.)		6 38.4								.036						
	23	(Mic.)		6 58.4								.030						
	24		5	+ 9 31.4	59.2	66.9	75.4	66.0	50.0	37.1	59.10	. .	30.308	42.0	34.5		42.2	42.7
	†25	γ Ceti	4	. . .	36 17 38.5	50.9	58.3	52.4	30.5	19.5	41.68*d*	. .	30.318	40.2	33.3	49.5	41.7	42.0
	†26		1	− 0 47.2	23 55 51.4	64.4	71.7	64.5	45.6	32.4	55.00	30.173	30.112	40.0	33.0		41.4	41.5
	27	Moon, N. L., (Mic.) .	2	0 32.8	"	"	"	"	"	"	"	.188						
	†28			− 0 20.3	"	"	"	"	"	"	"	.229						
	†29		4	+ 0 0.9	24 27 63.1	75.5	82.8	76.3	58.5	43.5	66.62*d*	30.300					41.4	41.2
	30	Moon, S. L., (Mic.) . .	5	0 16.3	"	"	"	"	"	"	"	.336						
	31		6	0 31.6	"	"	"	"	"	"	"	.378						
	†32		7	+ 0 46.1	"	"	"	"	"	"	"	.406						
December 2	†33	γ Cephei	4	. . .	322 7 20.5	27.0	42.0	29.6	15.3	0.0	22.40	. .	30.030	51.0	50.2		51.0	50.0
3	34	Aquarii, 7648, (Mic.) .	4	. . .	52 19 60.0	68.3	79.3	66.7	54.3	41.4	61.67	33.787	29.974	54.2	51.5	50.0	53.0	50.5
	†35	Neptune, (Mic.) . . .	4	. . .	"	"	"	"	"	"	"	27.765	29.974	54.2	51.5			
	36	α Piscis Australis . . .	4	. . .	69 16 63.0	71.0	83.0	72.7	59.6	44.5	65.63	. .	29.986	54.0	50.2		53.5	51.0
	†37	γ Cephei, Ref., (Mic.) . .	2	− 2 14.9	217 52 27.3	34.6	44.8	36.1	18.0	9.0	28.30*d*	29.686	29.986	53.5	47.0			
	†38		3	− 1 7.9	"	"	"	"	"	"	"	.700						
	39	γ Cephei	5	+ 1 6.1	322 7 20.7	27.2	39.5	27.8	14.2	1.3	21.79*d*	. .					53.0	51.0
4	40		1	− 0 48.6	61 24 72.7	81.4	90.1	81.0	66.6	52.8	74.10	30.359	30.194	49.8	47.4	50.2	50.7	49.4
	41	Sun, S. L., (Mic.) . .	2	0 33.6	"	"	"	"	"	"	"	.348						
	42		4	− 0 16.6	"	"	"	"	"	"	"	.352						
	43		5	+ 0 17.4	30 52 29.6	38.1	48.1	39.6	21.5	11.1	31.33*d*	30.208			47.8		50.5	52.5
	44	Sun, N. L., (Mic.) . .	6	0 33.4	"	"	"	"	"	"	"	.201						
	45		7	+ 0 49.4	"	"	"	"	"	"	"	.191						
	46	α Lyræ	4	. . .	0 14 44.8	51.9	62.8	52.6	35.1	25.9	45.52	. .	30.196	51.0	47.9		51.2	50.4
	†47	α Aquarii	4	. . .	39 56 19.0	29.1	38.1	29.9	13.6	1.1	21.70	. .	30.262	47.4	41.9	50.1	46.2	46.8
	†48	Lacertæ, 7765	4	. . .	359 55 51.3	60.0	72.0	63.8	45.1	32.0	53.53	. .			41.5		46.0	46.5
	†49	ζ Pegasi	4	. . .	28 50 50.1	60.1	70.9	61.8	44.8	32.0	53.28	. .	30.282	47.0	41.0		48.0	47.5
	†50	α Piscis Australis, (Mic.) .	4½	. . .	69 17 18.2	30.0	40.8	30.9	15.5	0.1	22.58*d*	30.299	30.286	47.0	40.6		47.9	47.2
	†51	α Ursæ Majoris, S. P., (Mic.)	3	. . .	281 32 26.6	34.5	45.1	35.6	18.5	6.3	27.74*d*	29.804			40.5	50.1	46.5	46.5
	†52	Uranus	4	. . .	35 23 44.1	53.8	64.8	53.2	36.1	24.0	46.00	. .	30.330	46.0	36.0		43.0	43.8

DATE.	MICROMETER. Coincid.	Val. 1 *r.*	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Nov. 30,		62.75	Moon .	26	15 54.38
Dec. 3, 22*h.*	29.993				
" 4, 17*h.*	29.982		Sun . .	40	16 17.61

Dec. 2. } Error of Runs —0″.35. Temp. of circle 50° ; of stone 50°
Dec. 3. }
Dec. 4. do. .40 do. 50° do. 50°
Dec. 3. 23¾*h.* Zenith Point by observation of γ Cephei, 0° 0′ 4″.10.
Error of level, 0″.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

CORRECTIONS FOR strument.	CORRECTIONS FOR Objects.	Corrected Readings.	Zenith Point. 359° 59′	Apparent Declinations.	Reduction to 1850.0	Observers.
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
+0 0.07	— 0 46.89	322 6 37.70	62.92	+ 76 47 4.47	+38.52	C.
-0 0.16	+ 0 11.38	10 38 44.40		+ 28 14 57.77	47.14	
-0 0.17	0 50.29	39 44 50.84		— 0 51 8.67	56.91	
-0 4.84	0 51.17	40 11 2.39		— 1 17 20.22	57.22	
-0 11.70	0 51.27	40 14 25.05		— 1 20 42.88	57.26	
16.43	0 51.28	40 14 20.33		— 1 20 38.16	57.26	
-1 33.10	0 51.27	40 13 3.65		— 1 19 21.48	57.23	
-1 10.24	0 51.36	40 15 47.08		— 1 22 4.91	57.21	
-1 43.31	+ 0 51.27	40 12 48.44		— 1 19 6.27	57.20	
-0 4.99	— 1 11.21	310 23 50.98		+ 88 29 50.88	42.97	
5.39	.21	51.38				
6.01	.21	52.00				
4.83	.21	50.82				
4.54	.21	50.53				
5.32	.21	51.31				
0.83	.22	50.86				
0.00	.22	51.30				
-0 0.66	.24	52.75				
-0 0.30	.25	51.78				
1.29	.26	50.78				
1.08	.26	50.99				
0.79	.26	51.28				
-0 0.19	.26	51.88				
-0 4.67	— 1 11.28	52.49				
-0 0.11	+ 0 44.74	36 18 26.53		+ 2 35 15.64	47.63	
-0 16.96	—23 3.19	23 48 29.32		— 15 5 12.85		
16.26						
17.38						
19.20	23 23.21					
19.52						
20.17						
-0 19.97						
+0 0.27	— 0 45.35	322 6 37.32	63.15	+ 76 47 5.08	38.23	P.
-3 58.10	+ 1 14.88	52 17 18.45	63.27	— 13 23 35.93	47.06	
+2 19.73	1 14.95	52 23 36.35		— 13 29 53.83		
0 0.17	2 32.74	69 19 38.54		— 30 25 56.02	61.09	
17.15	0 45.38	217 53 30.83		+ 76 47 7.14	38.09	
17.81	+ 0 45.38	31.49				
+0 0.64	— 0 45.38	322 6 37.05		+ 76 47 5.47	+38.09	
-0 24.12	+ 1 40.16	61 10 13.20	63.63	— 22 16 30.32		C.
23.11						
23.13						
13.96	1 37.84					
13.60						
13.17						
-0 0.09	0 0.26	0 14 45.69	63.25	+ 38 38 56.81	— 6.86	
+0 0.20	+ 0 50.01	39 57 11.91	62.87	— 1 3 29.79	+44.22	
0.06	— 0 0.07	359 55 53.52		+ 38 57 48.60	33.42	
+0 0.10	+ 0 33.00	28 51 26.38		+ 10 2 15.74	45.74	
-0 19.88	+ 2 37.33	69 19 40.03	62.77	— 30 25 58.01	+61.15	
+0 11.20	— 4 46.12	281 27 52.82		+ 62 34 10.80	—37.44	
-0 0.15	+ 0 42.80	35 24 28.65		+ 3 29 13.37		

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
December 3.		22*h*.					
179° 59′	62″0	70″2	81″0	69″2	55″7	42″7	63″47
	61.6	70.5	81.5	68.2	57.0	41.8	63.43
	62.2	70.4	81.0	69.0	56.3	42.2	63.52
P.	61.2	70.4	81.0	69.0	56.3	42.2	63.35
	61.5	70.2	61.0	69.0	56.0	42.4	63.35
	61.0	70.5	81.0	68.6	56.5	42.0	63.27
Means	61.58	70.37	81.08	68.83	56.30	42.22	63.397 —.127
December 4.		17*h*.					
179 59	61.7	70.4	80.1	70.1	56.0	41.8	63.35
	61.7	71.9	81.0	69.8	56.4	41.9	63.78
	62.0	72.1	80.9	70.1	56.1	42.5	63.95
C.	61.7	71.8	80.7	70.7	56.1	41.9	63.82
	61.3	71.5	80.6	70.9	56.0	42.1	63.73
	61.8	71.8	80.6	70.9	56.1	42.4	63.93
Means	61.70	71.58	80.65	70.42	56.12	42.10	63.761 —.130
December 4.		0*h*.					
179 59	60.9	70.9	80.1	70.3	53.8	41.4	62.90
	60.9	70.8	80.2	70.2	54.5	40.9	62.92
	60.5	70.8	80.5	70.0	54.9	40.9	62.93
C.	60.6	71.0	80.8	70.1	54.9	40.7	63.02
	60.1	71.1	80.2	69.9	55.0	40.1	62.73
	60.7	70.5	80.6	70.1	55.0	40.7	62.93
Means	60.62	70.85	80.40	70.10	54.68	40.78	62.905 —.130

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
3, No. 1	50.0	53.5	51.0
4, " 1	50.3	52.0	50.5
		52.5	50.0
" 2	50.1	47.2	47.5
		50.0	48.8

		H. M. S.	
3.	App. R. A.	0 14 2	(8 mag.)
4.	"	0 24 59	(9 ")
5.	"	0 27 42	(6.7 ")
6.	"	0 30 17	(7 ")
7.	"	0 40 31	(7 ")
8.	"	0 43 28	(9 ")
9.	"	0 43 49	(8 ")

1 to 9, 25, 49, 52. Very unsteady.
4, 5. Two obs. with mic. reduced to the meridian.
6, 8. Three obs. with mic. reduced to the meridian.
7, 51. Five obs. with mic. reduced to the meridian.
25. Foggy.
26 to 28. Correction for defective illumination, —8″.69.
29 to 32. Dec. by observation of S. L. —15° 5′ 7″.98.
33. Thick clouds immediately after; Zenith Point doubtful.
35. Cor. applied for parallax, —0″.22.
37, 38. Mercury unsteady.
47. Passed off from field a little North of wire.
48. Correction for divisions, —0″.07.
50. Six obs. with mic. reduced to the meridian.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER. A.	B.	C.	D.	E.	F.	Means.	Mic.	Barometer.	THERMOMET At.	Ext.	St.	Up
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
December 4	1		3	—10 1.5	310 24 52.9	62.2	72.1	60.1	46.1	32.8	54.37	. .	30.334	45.2	35.7	50.0	43.
	2	(Mic.)		8 1.5								29.944					
	3	(Mic.)		7 41.5								.939					
	4	(Mic.)		7 21.5								.934					
	5	(Mic.)		7 1.5								.938					
	6	(Mic.)		6 41.5								.934					
	7			4 21.5	57.1	66.9	76.9	65.0	51.8	37.0	59.12	. .					
	8	Polaris . . .	4	— 0 13.5	58.1	68.1	78.7	66.1	53.4	38.9	60.55	. .			34.9		44.
	9			+ 3 49.5	57.0	66.9	76.8	64.8	51.7	36.2	58.90	. .					
	10	(Mic.)		5 58.5								30.027					
	11	(Mic.)		6 28.5								.019					
	12	(Mic.)		6 48.5								.020					
	13	(Mic.)		7 8.5								.039					
	14	(Mic.)		7 28.5								.028					
	15		5	+ 9 32.5	53.6	63.0	73.1	61.4	46.9	33.9	55.32	. .	30.332	44.5	34.1		44.
5	†16	Sun, S. L. (Mic.) . .	3	— 0 15.6	61 34 62.7	75.0	85.0	73.5	59.6	43.0	66.47	32.427	30.500	40.2	39.0	45.0	43.
	†17	Sun, N. L.	4	+ 0 17.4	60 59 63.3	74.3	85.2	74.0	59.6	42.3	66.45	. .					
11	†18	Sun, S. L. (Mic.) . . .	3	— 0 17.0	62 9 64.0	70.4	82.0	69.7	60.0	43.3	64.90	30.053	30.002	47.5	44.8	47.5	48.
	†19	Sun, N. L.	5	+ 0 17.0	61 37 24.5	32.5	45.0	32.2	19.3	4.5	26.33*d*	. .					
12	20	Sun, S. L. (Mic.) . . .	3	— 0 16.0	62 14 65.0	74.5	86.7	73.0	63.0	43.4	67.60	30.475	30.142	43.0	43.0	47.0	46.
	21	Sun, N. L.	5	+ 0 18.0	61 41 60.7	69.7	82.5	69.0	57.6	39.5	63.17	. .					
	†22	ι Piscium	4	. . .	34 4 60.0	68.3	79.3	67.3	54.5	38.3	61.28	. .	30.142	45.0	33.0		
	23	α Andromedæ	4	. . .	10 38 31.8	39.7	52.2	40.0	26.2	9.5	33.23	. .	30.148	44.5	33.8		45.
	24	α Cassiopeiæ, Ref. (Mic.) .	3	— 0 27.7	196 47 61.5	68.8	80.4	67.7	55.0	39.6	62.17	29.785	30.136	43.0	34.3		
	25	α Cassiopeiæ	6	+ 0 54.3	343 11 48.7	56.6	70.5	56.2	44.3	29.0	50.88	. .					43.
	26		3	—10 4.4	310 24 58.0	67.5	78.5	64.0	54.4	35.2	59.60	30.081	30.136	42.7	33.3	46.5	41.
	27			8 4.4								.068					
	28			6 4.4								.038					
	29			4 4.4								.015					
	30			2 4.4								.013					
	31	Polaris, (Mic.)	4	— 0 12.4								29.990					
	32			+ 1 47.6								30.015					
	33			3 47.6								.040					
	34			5 47.6								.048					
	35			7 47.6								.055					
	36		5	+ 9 34.6								.087	30.130	40.5	34.0		
	37	γ Ceti	5	. . .	36 17 39.6	48.3	60.6	48.8	33.7	16.7	41.28*d*	. .	30.126	41.8	32.6		44.
14	38		1	— 0 48.3	61 50 26.1	36.6	46.9	36.1	21.1	6.0	28.80	30.548	30.210	43.2	39.5	45.0	46.
	39	Sun, N. L. (Mic.) . .	2	34.3	“	“	“	“	“	“	“	.516					
	40		3	16.3	“	“	“	“	“	“	“	.551					
	41		4	— 0 0.3	“	“	“	“	“	“	“	.540					
	42		5	+ 0 17.7	62 22 48.1	58.7	68.2	57.7	43.7	28.4	50.80*d*	30.298					48.
	43	Sun, S. L. (Mic.) . . .	6	0 33.7	“	“	“	“	“	“	“	.282					
	44		7	+ 0 50.7	“	“	“	“	“	“	“	.279					
	†45	α Lyræ	4	. . .	0 14 45.1	55.9	65.7	54.9	41.1	25.2	47.98	. .	30.182	44.2	39.6	45.0	45.
	†46	Weisse O, 246, (Mic.) .	4½	. . .	39 43 68.1	78.2	88.1	77.3	66.8	48.0	71.08	30.195	30.188	42.5	29.5	45.0	37.
	†47	Weisse O, 425, (Mic.) .	4	. . .	40 10 22.1	33.2	42.4	34.8	19.8	3.6	25.98	30.255			30.0		37.
	†48	Weisse O, 479, (Mic.) .	4	. . .	“	“	“	“	“	“	“	27.003					
	†49	Ceti, 163, (Mic.) . . .	4	. . .	“	“	“	“	“	“	“	27.075	30.182	41.5	30.1		
	†50	Weisse O, 712, (Mic.) .	4	. . .	“	“	“	“	“	“	“	28.307			30.2		
	†51	Weisse O, 762, (Mic.) .	2½	. . .	“	“	“	“	“	“	“	25.686					
	†52	Weisse O, 772, (Mic.) .	4	. . .	“	“	“	“	“	“	“	28.518	30.182	40.7	29.5		

DATE.	MICROMETER. Coincid.	Val. 1 *r*.	OBSERVED SEMI-DIAMETERS. Objects.	No.	Semi-diam.
	revs.	″			′ ″
Dec. 5, 17*h*.	29.993	62.75	Sun . .	16	16 15.03
“ 11, 18*h*.	29.993		Sun . .	18	16 18.65
“ 12, 18*h*.	29.993		Sun . .	20	16 18.24
“ 14, 18*h*.	29.991		Sun . .	38	16 20.43

Dec. 5. }
Dec. 11. } Error of Runs —0″.35. Temp. of circle 50°; of stone 50°
Dec. 12. do. do. .44 do. do. 44° do. 47°
Dec. 14. do. do. .61 do. do. 44° do. 45°
Dec. 12, 0¾*h*. Zenith Point, by observations of α Cassiopeiæ, 0° 0′ 3″.42; Error of level, 0″.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

ORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
strument.	Objects.		359° 59′		1850.0	
′ ″	′ ″	° ′ ″	″	° ′ ″	″	
0 5.16	—1 11.14	310 23 48.39	62.77	+ 88 29 53.49	+41.89	C.
5.65	.16	48.86				
5.69	.17	48.89				
5.75	.17	48.95				
5.26	.18	48.45				
5.28	.18	48.47				
0.97	.21	48.88				
0.00	.25	49.30				
0 0.75	.31	48.34				
0 0.95	.34	46.61				
0 0.13	.34	47.43				
0 0.03	.35	47.58				
0 0.92	.36	46.62				
0 0.03	.37	47.56				
0 4.69	—1 11.40	48.61				
2 32.56	+1 43.80	61 18 2.68	62.65	— 22 24 20.78		P.
0 0.18	1 41.38					
3.75	1 43.45	61 55 25.95	62.40	— 23 1 44.30		
0.02	1 41.00					
0 30.21	1 44.77	62 0 3.92	62.50	— 23 6 22.17		
0 0.20	1 42.30					
0.00	0 40.99	34 5 42.27	62.13	+ 4 47 59.11	52.52	
0 0.12	0 11.38	10 38 44.49		+ 28 14 56.89	47.30	
0 12.46	+0 18.26	196 48 32.89		+ 55 42 10.01	42.10	
0 1.34	—0 18.26	343 11 33.96		+ 53 42 7.42	42.10	
0 0.28	1 11.04	310 23 48.28		+ 88 29 53.79	40.13	
1.35	.04	47.21				
0.92	.03	47.65				
0.52	.03	48.05				
-0 1.03	.03	47.54				
-0 0.19	.03	48.76				
-0 1.21	.03	47.36				
2.20	.03	46.37				
1.70	.02	46.88				
0.71	.02	47.87				
-0 1.10	—1 11.02	47.48				
+0 0.20	+0 44.51	36 18 25.99		+ 2 35 15.39	+48.65	
—0 35.66	1 43.87	62 7 58.51	62.05	— 23 14 17.21		C.
33.25						
35.16						
34.28						
18.93	1 46.42					
17.97						
17.93						
0.10	0 0.25	0 14 48.13		+ 38 38 53.17	— 3.96	
12.74	0 50.79	39 44 49.13		— 0 51 7.83	+57.98	
—0 16.31	0 51.52	40 11 1.19		— 1 17 19.89	58.31	
+3 7.58	0 51.63	40 14 25.19		— 1 20 43.89	58.37	
3 3.10	0 51.61	40 14 20.69		— 1 20 39.39	58.37	
1 45.92	0 51.57	40 13 3.47		— 1 19 22.17	58.36	
4 30.19	0 51.68	40 15 47.85		— 1 22 6.55	58.35	
+1 32.66	+0 51.63	40 12 50.27		— 1 19 8.97	+58.33	

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
December 11.		17*h*.,	40*m*.				
179° 59′	61″6	68″3	82″4	66″5	56″8	40″0	62″60
	60.3	68.6	82.4	65.4	57.7	38.4	62.13
P.	61.4	69.2	82.4	66.5	57.6	39.8	62.82
	61.2	69.2	81.7	66.5	57.6	39.2	82.57
Means	61.12	68.83	82.22	66.23	57.42	39.35	62.529
							—.131
December 12.		17*h*.,	40*m*.				
179 59	61.2	69.2	83.0	68.3	56.8	39.2	62.95
	60.4	69.7	83.4	66.7	58.0	37.8	62.67
	60.8	69.0	82.8	67.8	56.0	39.0	52.57
P.	60.0	69.6	82.8	66.8	57.4	38.0	62.43
	60.5	69.2	82.8	68.3	56.7	38.7	62.70
	60.0	69.8	82.8	67.0	57.3	37.8	62.45
Means	60.48	69.42	82.93	67.48	57.03	38.42	62.628
							—.129
December 12.		23*h*.,	40*m*.				
179 59	61.8	68.2	81.8	66.7	55.7	38.7	62.15
	60.6	69.0	82.6	65.2	58.0	37.5	62.15
	61.5	68.5	82.0	67.3	56.0	39.4	62.45
P.	60.5	69.2	82.7	66.2	57.7	37.7	62.33
	61.5	68.6	81.5	67.0	56.0	38.7	62.22
	60.5	69.0	82.4	67.0	57.3	37.4	62.27
Means	61.07	68.75	82.17	66.57	56.78	38.23	62.261
							—.130
December 14.		20*h*.					
179 59	59.9	69.6	79.9	68.2	56.1	38.6	62.05
	59.6	70.0	80.1	68.6	55.9	39.1	62.22
	59.1	70.3	80.3	69.0	56.0	38.9	62.27
C.	59.1	70.3	80.4	68.4	56.1	38.8	62.13
	59.1	70.1	80.0	68.9	56.1	38.8	62.17
	59.4	70.2	80.0	68.9	56.1	39.0	62.27
Means	59.37	70.08	80.07	68.67	56.05	38.87	62.183
							—.130
December 15.		18*h*.					
179 59	61.7	71.0	82.6	69.3	57.5	38.0	63.35
	60.6	71.6	82.6	67.7	58.3	37.2	63.00
	60.4	71.3	82.0	67.7	57.5	38.2	62.85
P.	60.7	71.5	82.0	58.7	58.0	37.7	63.10
	60.3	71.0	82.0	68.7	58.0	37.3	62.88
	60.7	71.5	82.0	68.7	58.0	37.5	63.07
Means	60.73	71.32	82.20	68.47	57.88	37.65	63.042
							—.126
December 16.		18*h*.					
179 59	61.0	71.4	84.7	68.0	59.5	36.7	63.55
	59.8	71.4	84.7	66.3	60.4	34.6	62.87
	60.7	71.4	84.7	67.5	59.2	36.0	63.25
P.	60.7	72.4	84.7	67.5	61.3	35.2	63.63
	60.3	71.5	84.2	67.5	58.6	35.3	62.90
	59.8	72.0	85.0	66.0	61.0	34.8	63.10
Means	60.38	71.68	84.67	67.13	60.00	35.43	63.217
							—.125

THERMOMETERS.

IR POINTS.	Stone.	Upper.	Lower.
	°	°	°
11, No. 1	47.5	50.0	47.5
12, " 1	47.0	47.5	45.5
" 2	46.5	46.5	45.0
14, " 1	45.0	44.0	43.0
		46.0	44.0
15, " 1	42.0	43.5	41.0
16, " 1	38.0	37.5	39.0

		H. M. S.	
46.	App. R. A.	0 14 2	(7.8 mag.)
47.	"	0 25 1	(9 ")
48.	"	0 27 43	(6 ")
49.	"	0 30 16	(7 ")
50.	"	0 40 32	(8 ")
51.	"	0 43 28	(9 ")
52.	"	0 43 49	(7 ")

16, 17. Overcast: limbs poorly defined; Zenith Point doubtful.
18, 19. Wind high; unsteady; limbs jagged.
22, 45 to 52. Very unsteady.
46, 49, 50. Five obs. with mic. reduced to meridian.
47, 48. Three obs. with mic. reduced to meridian.
51. Two obs. with mic. reduced to meridian. Mic. reading erroneously noted 24*r*.
52. Four obs. with mic. reduced to the meridian.
Nadir Point, Dec. 15. Mercury unsteady; determination difficult.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	Vertical wires.	Hour Angles.	READINGS OF CIRCLE AND MICROMETER.								Barometer.	THERMOMET			
					A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up
			No.	M. S.	° ′ ″	″	″	″	″	″	″	Revs.	In.	°	°	°	°
December 14	†1	Weisse I, 40, (Mic.)	4	. . .	41 37 36.8	48.6	58.9	48.3	33.8	17.0	40.57*d*	26.979			29.6		36.
	†2	Weisse I, 72, (Mic.)	4½	. . .	"	"	"	"	"	"	"	34.397					
	†3	Weisse I, 225, (Mic.)	4	. . .	"	"	"	"	"	"	"	27.041	30.170	38.0	29.1		
15	†4	Sun, S. L. (Mic.)	3	— 0 15.7	62 27 33.8	42.2	53.6	43.1	26.7	11.0	35.07*d*	31.696	30.158	37.0	35.0	42.0	39
	†5	Sun, N. L.	5	+ 0 16.3	61 52 70.2	78.8	90.3	76.5	65.8	46.7	71.38	. .					
	6	α Lyræ		. . .	0 14 47.5	56.2	68.5	54.8	41.7	26.5	49.20	. .	30.134	39.0	34.2		42
16	†7	Sun, S. L. (Mic.)	3	— 0 17.5	62 29 65.0	75.0	86.0	74.6	62.7	42.5	67.63	31.440	30.082	34.7	35.0	38.0	
	†8	Sun, N. L. (Mic.)	5	+ 0 16.5	61 57 28.5	39.3	50.5	39.0	24.5	6.4	31.37*d*	31.440					
	9	α Lyræ	4	. . .	0 14 48.5	57.6	70.8	56.0	46.4	24.3	50.60	. .	30.052	36.0	37.0		40
18	10	Sun, S. L. (Mic.)	2	— 0 17.7	62 34 61.6	71.6	83.0	67.5	64.0	40.0	64.62	32.178	29.468	45.0	41.8	42.0	45
	11	Sun, N. L.	5	+ 0 16.3	61 59 71.5	81.0	93.5	77.4	72.4	48.8	74.10	. .					
19	12		3	—10 5.2	310 24 63.4	71.8	86.0	66.2	63.6	38.8	64.97	30.241	29.692	41.8	34.5		
	13			8 5.2								.213					
	14			6 5.2								.183					
	15			4 5.2								.164					
	16			2 5.2								.154					
	17	Polaris, (Mic.)	4	— 0 21.2								.151	29.696	41.0	34.5		
	18			+ 1 38.8								.155					
	19			3 38.8								.165					
	20			5 38.8								.189					
	21			7 38.8								.205					
	22		5	+ 9 32.8								.225	29.698	40.8	34.1		38.0
	23	Weisse I, 594, (Mic.)	4	. . .	42 13 64.0	73.5	87.4	69.8	65.2	40.6	66.75	27.604	29.698	40.2	34.0		
	24	Weisse I, 715, (Mic.)	5	. . .	42 45 63.6	72.2	85.8	69.4	63.5	39.2	65.62	30.426					
	25	Weisse I, 942, (Mic.)	4	. . .	42 56 63.2	72.2	86.4	70.2	63.4	39.5	65.82	27.674	29.698	39.5	34.0		
21	†26	Sun, S. L. (Mic.)	1	— 0 16.0	62 37 31.6	42.5	55.3	39.1	29.5	7.6	34.27*d*	31.914	30.136	39.0	39.7	40.0	40.0
	†27	Sun, N. L.	5	+ 0 18.0	62 2 55.0	65.7	78.5	61.7	55.3	32.1	58.05*d*	. .					
	28	α Lyræ	4	. . .	0 14 47.5	57.4	70.6	54.2	46.0	24.8	50.08	. .	30.138	39.9	39.6		42.0
22	29	Sun, S. L. (Mic.)	3	— 0 17.2	62 37 31.0	43.2	55.6	39.9	29.4	7.3	34.40*d*	31.944	30.198	35.5	37.0	39.0	37.5
	30	Sun, N. L.	5	+ 0 16.8	62 2 52.5	65.3	77.0	58.6	54.0	29.4	56.13	. .					
	31	α Lyræ	4	. . .	0 14 48.4	60.2	72.7	56.2	48.8	20.3	51.07	. .	30.194	36.0	37.5		38.5
23	32		1	— 0 49.5	62 34 67.0	78.3	87.7	73.0	67.6	43.6	69.53	30.120	30.528	38.5	37.1	39.5	40.2
	33	Sun, S. L. (Mic.)	3	0 32.5	"	"	"	"	"	"	"	.124					
	34		3	— 0 16.5	"	"	"	"	"	"	"	.126					
	35		4†	+ 0 4.5	62 1 79.1	90.5	101.4	86.2	78.0	56.3	81.92*d*	29.944			37.5		40.5
	36	Sun, N. L. (Mic.)	5	0 17.5	"	"	"	"	"	"	"	.950					
	37		6	0 33.5	"	"	"	"	"	"	"	.941					
	38		7	+ 0 51.5	"	"	"	"	"	"	"	.944					
	†39	α Lyræ, (Mic.)	4	. . .	0 14 51.2	61.7	74.0	57.1	50.0	29.0	53.83	30.060	30.522	39.2	36.6		40.0
	†40	Weisse II, 443	3½	. . .	45 12 27.5	40.4	33.3	38.0	28.0	28.3	32.58*d*	31.149				39.5	29.2
	†41	Weisse II, 566	5	. . .	"	"	"	"	"	"	"	29.517	30.528	33.0	25.1		
	42	Jupiter, N. L.	4	. . .	47 45 2.4	14.8	8.7	9.9	5.3	1.8	7.17	. .	30.508	32.6	22.8	39.0	33.6
	†43	Jupiter, S. L. (Mic.)	4	. . .	"	"	"	"	"	"	"	29.230					
26	44	α Lyræ	4	. . .	0 14 49.5	58.7	54.0	51.8	52.4	49.2	52.60	. .	30.258	41.2	41.5		
	45		3	—10 9.2	310 25 2.0	10.5	5.7	2.3	4.0	1.3	4.30	30.216	30.182	42.2	36.3		
	46			8 9.2								.176					
	47			6 9.2								.166					
	48			4 9.2								.156					
	49			2 9.2								.148					
	50	Polaris, (Mic.)	4	— 0 21.2								.138					
	51			+ 1 38.8								.144					
	52			+ 3 38.8								.148					

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r.*	Objects.	No.	Semi-diam.
	revs.	″			′ ″
Dec. 15, 18*h.*	29.993	62.75	Sun . .	4	16 19.73
" 16, 18*h.*	29.995		Sun . .	7	16 19.27
" 18, 18*h.*	29.995		Sun . .	10	16 17.90
" 21, 18*h.*	29.990		Sun . .	26	16 18.83
" 22, 19*h.*	29.995		Sun . .	29	16 19.30
" 23, 19*h.*	29.993		Sun . .	32	16 19.14
			Jupiter .	42	0 24.02
" 26. 19*h.*	29.994				

Dec. 15.
Dec. 16.
Dec. 18. } Error of Runs —0″.76. Temp. of circle 40°; of stone 40°
Dec. 19.
Dec. 21.
Dec. 23. do. 0.79 do. 40° do. 40°
Dec. 23, 20*h.* do. 1.19 do. 33° do. 39°
Dec. 26. do. —0.25 do. 50° do. 50°
Dec. 23, 19*h.* Adjusted microscopes C. & F.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

	CORRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
	Instrument.	Objects.		359° 59′		1850.0	
	′ ″	′ ″	° ′ ″	″	° ′ ″	″	
1	+3 9.15	+0 54.38	41 41 44.10	62.05	+ 2 48 2.80	+58.39	C.
2	−4 36.18	0 54.13	41 33 58.52		− 2 40 17.22	58.27	
3	+3 5.26	0 54.43	41 41 40.26		− 2 47 58.96	+57.90	
4	−1 46.97	1 47.57	62 11 15.94	62.92	− 23 17 33.77		P.
5	0 0.19	1 45.02					
6	0 0.10	0 0.26	0 14 49.36		+ 38 38 52.81	− 3.71	
7	1 30.66	1 47.53	62 14 5.23	63.09	− 23 20 22.89		
8	1 30.38	1 44.97					
9	0 0.10	0 0.26	0 14 50.76		+ 38 38 51.58	− 3.45	
0	−2 17.09	1 43.88	62 18 13.51	61.62	− 23 24 32.64		
1	+0 0.09	+1 41.42					
2	−0 10.09	−1 9.83	310 23 45.05	61.79	+ 88 29 55.83	+38.78	
3	10.22	.83	44.92				
4	9.81	.83	45.33				
5	9.68	.84	45.45				
6	9.69	.84	45.44				
7	9.71	.84	45.42				
8	9.82	.85	45.30				
9	9.90	.86	45.21				
0	10.43	.87	44.67				
1	10.05	.89	45.03				
2	−0 9.60	−1 9.91	45.46				
3	+2 29.98	+0 54.16	42 17 30.89		− 3 23 49.85	54.78	
4	−0 26.59	0 55.09	42 46 34.12		− 3 52 53.08	54.49	
5	+2 26 11	0 55.54	43 0 27.47		− 4 6 46.43	+56.29	
6	−2 0.87	1 47.18	62 21 1.75	62.12	− 23 27 20.38		
7	+0 0.25	1 44.62					
8	−0 0.09	0 0.26	0 14 50.25		+ 38 38 51.12	− 1.95	
9	2 2.46	1 48.06	62 21 0.70	61.86	− 23 27 19.59		
0	0 0.23	1 45.49					
1	0.10	0 0.26	0 14 51.23		+ 38 38 49.88	1.60	
2	8.94	1 49.20	62 20 30.87	61.85	− 23 26 49.77		C.
3	8.72						
4	−0 8.50						
5	+0 3.15	1 46.59					
6	2.87						
7	3.47						
8	3.16						
9	−0 4.26	0 0.26	0 14 49.83		+ 38 38 51.27	− 1.26	
40	−1 12.38	1 2.81	45 12 23.01	61.74	− 6 18 42.02	+53.76	
41	+0 30.20	1 2.87	45 14 5.65		− 6 20 24.66	+53.02	
42	0.02	0 19.46	17 45 50.65		+ 21 7 51.34		
43	+0 48.05	0 19.47					
44	−0 0.09	+0 0.26	0 14 52.77	62.80	+ 38 38 49.28	− 0.32	P.
45	8.50	−1 10.70	310 23 45.10	62.26	+ 88 29 56.64	+37.81	
46	7.88	.70	45.72				
47	8.74	.69	44.87				
48	9.18	.69	44.43				
49	9.33	.68	44.29				
0	8.93	.68	44.69				
1	9.17	.67	44.46				
2	8.87	.67	44.76				

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
December 18.		18*h*.					
179° 59′	60″0	69″0	82″0	62″5	58″6	36″3	61″40
	59.7	69.6	82.7	61.6	60.8	35.0	61.57
	60.0	69.2	82.4	62.8	59.7	36.3	61.73
P.	60.0	69.5	82.8	62.8	60.6	35.7	61.90
	60.2	69.5	82.8	62.8	60.0	36.3	61.93
	60.2	69.5	82.6	62.8	60.3	36.3	61.95
Means	60.02	69.38	82.55	62.55	60.00	35.98	61.747 —.130
December 19.		0*h*.,	30*m*.				
179 59	60.2	68.3	82.4	64.3	57.8	37.0	61.67
	59.5	68.7	83.0	64.3	58.7	36.0	61.70
	60.0	68.6	82.8	65.3	57.3	37.4	61.90
P.	59.8	69.3	83.5	64.5	59.5	36.3	62.15
	60.0	68.8	82.8	65.3	57.8	38.2	62.15
	59.7	69.4	83.5	64.2	59.3	35.7	61.97
Means	59.87	68.85	83.00	64.65	58.40	36.77	61.922 —.129
December 21.		18*h*.,	40*m*.				
179 59	60.3	69.8	83.7	65.3	58.0	36.3	62.23
	59.3	70.0	84.4	63.8	60.3	34.4	62.03
	60.3	70.3	84.0	65.3	59.5	35.7	62.52
P.	59.7	70.3	84.0	64.2	60.0	35.0	62.20
	60.0	70.0	83.6	64.5	58.8	36.0	62.15
	59.8	70.5	84.3	64.0	60.3	35.2	62.35
Means	59.90	70.15	84.00	64.52	60.48	35.43	62.247 —.129
December 22.		18*h*.,	40*m*.				
179 59	57.7	71.2	83.3	65.8	59.0	34.2	61.87
	57.8	71.5	83.7	64.6	60.3	33.8	61.95
	58.0	71.5	83.5	64.6	60.0	34.0	61.93
P.	58.0	71.2	83.0	64.4	59.7	33.8	61.68
	58.5	71.6	83.7	65.2	60.4	34.3	62.28
	58.5	71.7	83.5	65.0	60.4	34.3	62.23
Means	58.08	71.45	83.45	64.93	59.97	34.07	61.992 —.128
December 23.		18*h*.,	40*m*.				
179 59	58.9	70.9	81.6	65.3	57.5	36.4	61.77
	58.8	71.4	82.7	64.9	59.2	36.1	62.18
	58.9	71.5	82.6	65.0	59.6	35.4	62.17
C.	58.6	71.5	82.1	65.1	59.3	35.4	62.00
	58.3	71.5	81.9	64 5	59.1	34.9	61.70
	58.6	71.6	82.2	65.0	59.8	35.1	62.05
Means	58.68	71.40	82.18	64.97	59.08	35.55	61.978 —.130
December 23.		4*h*.					
179 59	54.4	71.4	62.3	66.1	60.0	56.0	61.70
	54.4	71.1	62.1	66.1	59.9	57.0	61.77
	54.9	71.1	62.2	66.0	59.9	56.9	61.83
C.	54.8	71.5	62.9	65.9	59.9	57.0	62.00
	54.4	71.9	62.8	66.1	59.9	57.5	62.10
	54.4	71.1	62.1	66.1	59.9	57.2	61.80
Means	54.55	71.35	62.40	66.05	59.92	56.93	61.867 —.126

THERMOMETERS.

ADIR POINTS.	Stone.	Upper.	Lower.
	°	°	°
c. 18, No. 1	42.0	47.0	43.0
19, " 1		44.0	42.0
21, " 1	40.0	42.5	40.5
22, " 1	39.0	39.5	38.5
23, " 1	39.5	41.5	39.0
		42.0	39.5
" 2	39.0	29.5	31.5
		33.2	33.8

		H. M. S.	
1.	App. R. A.	1 3 29	(9 mag.)
2.	"	1 5 34	(9 ")
3.	"	1 14 2	(9 ")
23.	"	1 33 2	
24.	"	1 39 19	
25.	"	1 52 34	
40.	"	2 26 33	(7.8 ")
41.	"	2 32 34	

1 to 3, 40 to 43, Very unsteady.
1, 40. Four obs. with mic. reduced to the meridian.
2. Five obs. with mic. reduced to the meridian.
3, 39. Seven obs. with mic. reduced to the meridian.
4, 5, 7, 8, 26, 27. Limbs poorly defined.
40. Double; observed the Nn. of the two.
41. Three obs. with mic. reduced to the meridian.
Nadir Points, Dec. 15, 16, on page 155.
Nadir Point, Dec. 26, on page 159.

		READINGS OF CIRCLE AND MICROMETER.										Barometer.	THERMOMETERS			
	Hour Angles.			A.	B.	C.	D.	E.	F.	Means.	Mic.		At.	Ext.	St.	Up.
	m. s.	°	'	"	"	"	"	"	"	"	*Revs.*	*In.*	°	°	°	°
	— 5 38.8										30.153					
	7 38.8										.180					
5	— 9 26.8										.212	30.168	41.6	36.4		40.5
4	— 0 0.6	29	15	36.2	44.5	39.2	42.2	36.0	38.0	39.35	. .	30.162	41.2	36.2	40.0	40.0
4	0 0.2	62	25	37.4	47.4	39.7	44.2	35.3	39.5	40.58	. .	29.588	52.2	61.6	45.0	54.5
1	0 48.5	61	50	9.4	18.8	7.1	15.9	6.2	15.2	12.10	30.480	30.270	48.5	45.0	47.5	48.5
2	0 33.5			"	"	"	"	"	"	"	.481					
3	— 0 17.5			"	"	"	"	"	"	"	.499					
4†	+ 0 4.5	62	22	12.0	22.0	10.2	19.8	9.0	18.1	15.19*d*	29.941			44.9		47.9
5†	0 19.5			"	"	"	"	"	"	"	.950					
6	0 35.5			"	"	"	"	"	"	"	.961					
7	+ 0 51.5			"	"	"	"	"	"	"	.959					
3	— 0 16.3	62	19	60.0	67.8	59.3	65.3	55.3	64.2	61.98	31.396	29.854	49.0	54.2	48.0	52.0
5	+ 0 18.7	61	45	56.0	63.4	55.3	62.3	51.5	59.7	58.03	. .					
5	. . .	16	9	9.6	15.5	7.7	13.2	4.4	11.3	10.28	. .	29.978	52.0	48.1		50.5
4	. . .	36	17	44.1	51.2	43.8	50.7	38.0	47.1	45.82*d*	. .	29.984	51.0	48.2		50.0
4	. . .	0	14	52.1	59.1	50.0	59.0	46.4	58.0	54.10	. .	29.880	59.0	61.0	50.7	56.4

DATE.	MICROMETER.		OBSERVED SEMI-DIAMETERS.		
	Coincid.	Val. 1 *r.*	Objects.	No.	Semi-diam.
	revs.	"			' "
Dec. 29, 19*h.*	29.990	62.75	Sun . .	6	16 19.94
" 30, 19*h.*	29.993		Sun . .	11	16 19.03

Dec. 28. Error of Runs —0″.31. Temp. of circle 50°; of stone 46°
Dec. 29. do. .43 do. 48° do. 48°
Dec. 30. do. .25 do. 50° do. 50°
Dec. 31. do. +0.16 do. 56° do. 51°

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

RRECTIONS FOR		Corrected Readings.	Zenith Point.	Apparent Declinations.	Reduction to	Observers.
rument.	Objects.		359° 59′		1850.0	
″	′ ″	° ′ ″	″	° ′ ″	″	
8.21	— 1 10.66	310 23 45.43				P.
8.52	.66	45.12				
8.93	1 10.66	44.71				
0.01	43.33.16	28 32 6.20	62.24	+ 10 21 35.29		
0.02	—14 37.77	62 11 2.79	62.60	— 23 17 20.94		
31.66	+ 1 42.85	62 7 43.22	62.82	— 23 14 1.15		C.
31.28						
32.03						
3.13	1 45.35					
2.66						
2.01						
2.06						
28.13	1 41.50	62 3 56.32	63.11	— 23 10 13.96		P.
0.17	1 39.09					
0.02	0 16.93	16 9 27.19	62.78	+ 22 44 14.84	+47.60	
0.09	0 42.93	36 18 28.84		+ 2 35 13.19	+50.19	
0.07	+ 0 0.25	0 14 54.28	63.15	+ 38 38 48.12	— 1.42	C.

NADIR POINTS—READINGS.

	A.	B.	C.	D.	E.	F.	Means.
December 26.		18*h*.,	40*m*.				
179° 59′	59″0	69″7	64″6	61″0	62″0	58″8	62″52
	59.5	70.4	66.3	60.5	63.8	57.8	63.05
	59.7	70.2	65.3	61.2	62.5	59.2	63.02
P.	58.5	70.7	65.6	60.4	63.8	57.8	62.80
	59.8	70.7	65.3	62.0	63.0	59.2	63.33
	59.0	70.5	65.7	60.8	63.0	58.0	62.83
Means	59.25	70.37	65.47	60.98	63.02	58.47	62.925 —.129
December 26.		0*h*.,	30*m*.				
179 59	59.6	68.4	63.5	61.5	60.4	60.7	62.35
	58.5	68.4	64.3	60.5	61.4	58.2	61.88
	59.5	68.6	64.3	62.2	60.6	60.2	62.57
P.	59.2	69.0	64.8	61.2	61.7	58.8	62.45
	60.0	68.4	64.2	62.0	59.8	59.8	62.37
	59.0	69.5	64.7	61.0	62.3	59.2	62.62
Means	59.30	68.72	64.30	61.40	61.03	59.48	62.372 —.130
December 29.		19*h*.,	30*m*.				
179 59	60.2	69.8	61.1	66.0	57.1	64.5	63.12
	59.9	69.8	60.1	66.1	55.8	65.3	62.83
	59.7	69.8	60.2	66.0	55.8	65.0	62.75
C.	59.2	70.2	60.1	66.9	56.1	65.0	62.92
	59.2	70.8	60.6	67.1	56.1	65.2	63.17
	59.1	70.0	60.3	66.9	56.1	65.0	62.90
Means	59.55	70.07	60.40	66.50	56.17	65.00	62.947 —.131
December 30.		19*h*.					
179 59	62.0	69.0	61.7	66.0	56.6	65.0	63.38
	60.3	69.8	62.0	65.2	58.4	64.0	63.28
	61.2	69.2	61.5	66.2	57.0	63.8	63.15
P.	60.4	69.7	61.5	65.8	58.0	63.2	63.10
	60.7	70.0	62.0	65.2	58.5	62.6	63.17
	60.7	70.0	62.0	66.2	58.5	63.0	63.40
Means	60.88	69.62	61.78	65.77	57.83	63.60	63.247 —.132
December 30.		1*h*.					
179 59	61.7	67.5	61.6	66.3	55.5	64.7	62.88
	61.8	67.8	62.0	65.0	57.3	63.4	62.88
	62.6	67.8	62.0	65.8	56.4	64.2	63.13
P.	61.6	67.8	62.0	65.2	57.4	63.3	62.88
	61.8	67.8	61.2	65.7	56.7	63.8	62.88
	61.8	67.8	61.5	65.7	56.7	63.8	62.88
Means	61.88	67.75	61.77	65.62	56.67	63.87	62.908 —.132
December 31.		18*h*.					
179 59	61.6	68.9	60.3	67.4	55.1	66.4	63.28
	61.2	68.3	60.1	66.9	55.9	66.0	63.07
	60.9	69.0	60.9	66.9	57.0	65.2	63.32
C.	61.0	68.9	60.6	67.5	56.1	66.4	63.42
	60.9	69.1	60.9	67.9	56.9	65.2	63.48
	60.7	69.0	60.4	67.1	56.4	65.1	63.12
Means	61.05	68.87	60.53	67.28	56.23	65.72	63.280 —.133

	THERMOMETERS.		
POINTS.	Stone.	Upper.	Lower.
	°	°	°
26, No. 1		45.0	40.5
" 2	40.0	42.5	41.5
29, " 1	48.0	49.2	46.9
		50.0	46.8
30, " 1	48.0	53.0	49.0
" 2		53.0	52.0
31, " 1	50.7	56.4	51.8

4. Cloudy soon after.
5. Passing clouds; Zenith Point doubtful.
13, 14. Limbs jagged and unsteady.
Nadir Point, Dec 26, No. 1. Much parallax with microscope F.

DATE. 1846.	No. for ref.		OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	T
				I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		A
				s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	
Jan. 3	†1		Sun, 1st and N. L.	..	35.4	46.2	58.2	9.2	20.5	..	18 54 57.90	298 34 29.2	29.8	34.3	37.2	32.62	. .	29.846	46
4	2	α	Lyræ	32.4	45.6	59.3	12.3	26.3	40.0	53.0	18 31 12.70	359 44 59.5	61.3	57.2	61.0	59.75	. .	30.216	37
5	3		Sun, 1st and S. L.	11.5	23.5	34.2	45.3	57.0	8.5	19.2	19 3 45.60	298 15 20.8	22.3	25.0	24.7	23.20	. .	30.216	38
	4		Venus, 1st and S. L.	25.4	36.3	47.0	57.2	8.8	19.3	29.4	22 13 57.63	309 51 36.7	39.5	40.7	39.4	39.08	. .	30.216	42
	5	γ	Pegasi	17.0	27.9	38.4	49.2	0.3	11.2	21.5	0 4 49.36	335 26 29.2	35.5	34.5	35.0	33.55	. .	30.248	43
	6		Uranus, (Center)	57.4	8.2	18.5	28.6	39.3	50.0	0.3	0 24 28.90	323 4 8.7	11.0	13.4	13.7	11.70	. .	30.254	43
	7		Mars, 1st and S. L.	49.8	0.5	10.8	21.2	31.8	42.5	52.8	0 33 21.34	324 51 51.0	56.3	55.7	56.0	54.75	. .	30.258	43
	8			18.0								49 34 75.1	66.2	69.6	72.4	70.82	. .	30.256	45
	9				58.0							63.4	53.8	59.2	60.3	59.18	. .		
	10					36.0						55.6	45.5	50.5	54.5	51.52	. .		
	11		Polaris				11.0				1 4 15.86	53.4	42.8	48.6	50.0	48.70	. .	30.260	43
	12							59.0				58.0	47.5	52.0	54.7	53.05	. .		
	13								42.0			64.0	54.3	59.1	61.1	59.62	. .		
	14									7.0		74.0	65.0	70.1	71.2	70.08	. .	30.270	42
	†15		Moon, 1st and S. L.	10.2	21.1	32.0	42.8	54.1	5.1	16.0	1 56 43.04	333 43 8.4	11.0	11.3	11.5	10.55	. .	30.266	41
	16	γ	Ceti	19.4	30.0	40.4	50.7	1.4	12.2	22.0	2 34 50.87	323 42 2.9	8.2	8.3	7.4	6.70	. .	30.274	40
	17	α	Ceti	14.2	24.5	35.0	45.2	56.1	6.6	16.8	2 53 45.49	324 35 53.4	58.5	58.5	59.5	57.47	. .	30.280	39
	18	α	Persei	6.2	22.4	38.3	54.3	10.5	27.0	42.5	3 12 54.46	10 24 46.0	43.2	47.5	49.1	46.45	. .	30.282	39
	19	η	Tauri	18.1	29.4	41.0	52.3	4.0	15.6	26.7	3 37 52.44	344 44 3.3	5.8	4.2	6.8	5.02	. .	30.270	38
	20	ζ	Ursæ Minoris, S. P.	34.0	42.5	51.3	59.0	8.3	16.5	26.2	3 48 59.69	62 48 38.5	34.8	38.4	40.1	37.95	. .	30.286	37
	21	α	Tauri	4.4	16.0	26.5	37.4	48.2	59.5	10.0	4 26 37.43	337 18 18.8	24.8	24.5	25.2	23.32	. .	30.284	36
	22	α	Aurigæ	7.2	22.1	37.3	52.2	8.0	22.8	37.2	5 4 52.69	6 56 15.5	13.8	13.2	16.5	14.75	. .	30.300	35
	23	β	Tauri	30.5	42.4	54.3	5.8	18.0	30.0	41.5	5 16 6.07	349 34 42.0	44.3	42.6	44.9	43.45	. .	30.300	35
	24	α	Leporis	55.0	6.1	17.0	28.0	39.3	50.4	1.0	5 25 28.11	303 11 24.8	30.8	31.0	32.7	29.83	. .		
	25	α	Columbæ	58.3	11.0	23.4	36.0	49.0	1.8	13.8	5 33 36.19	286 59 48.9	50.2	54.7	52.4	51.55	. .	30.300	35
	26	α	Orionis	50.6	1.5	11.7	22.0	33.0	43.3	53.5	5 46 22.23	328 29 9.0	13.3	13.3	14.5	12.52	. .	30.304	34
	27									3.0		54 28 55.3	48.0	55.0	55.3	53.40	. .		
	28								53.0			62.5	56.9	62.6	62.9	61.22	. .		
	29							49.0				65.3	59.3	65.3	65.5	63.85	. .		
	†30	δ	Ursæ Minoris, S. P.				50.5				6 20 48.36	64.7	59.0	65.3	65.3	63.58	. .	30.306	34
	31					45.0						65.0	59.7	65.2	66.0	63.98	. .		
	32				40.0							62.3	56.8	62.4	62.5	61.00	. .		
	33			38.0								58.4	53.2	58.7	59.5	57.45	. .		
	34	α	Canis Majoris	20.8	32.0	43.0	53.2	4.8	15.8	26.2	6 37 53.69	304 37 5.4	9.5	13.5	12.0	10.10	. .		
7	35	α	Tauri	3.0	13.8	24.7	35.4	46.7	57.7	8.4	4 26 35.67	337 18 18.3	24.0	23.8	24.6	22.68	. .	29.846	44
	†36	α	Aurigæ, (ref.)	4.8	20.0	..	..	5.0	20.3	..	5 4 42.52	173 3 40.3	42.9	40.8	45.3	42.32	. .	29.850	44
	37	β	Tauri	28.6	40.7	52.6	4.3	16.2	28.4	40.2	5 16 4.43	349 34 42.0	46.9	44.0	47.5	45.10	. .	29.852	44
	38	δ	Orionis	7.4	17.4	28.0	38.2	49.0	59.7	10.0	5 23 38.53	320 41 50.0	53.5	55.5	56.3	53.82	. .		
	39	ε	Orionis	23.0	33.3	43.6	54.0	4.8	15.3	25.3	5 27 54.19	319 48 39.5	40.3	45.0	45.5	42.58	. .	29.852	44
	40	α	Columbæ	56.4	9.2	22.0	34.2	47.1	0.0	12.2	5 33 34.44	286 59 36.3	37.6	43.3	40.6	39.45	. .	29.854	44
	41	α	Orionis	48.5	59.3	10.0	20.4	30.8	41.5	51.8	5 46 20.33	328 29 8.4	12.0	11.0	12.5	10.98	. .	29.856	44
	42									2.5		54 28 62.5	56.1	62.0	63.4	61.00	. .		
	43								53.0			67.5	62.3	68.0	69.0	66.70	. .		
	44							49.5				71.0	64.8	70.2	71.5	69.38	. .		
	45	δ	Ursæ Minoris, S. P.				50.5				6 20 48.07	71.3	65.0	71.2	71.2	69.68	. .	29.840	43
	46					45.0						70.0	64.1	70.0	71.0	68.78	. .		
	47				40.0							66.4	60.1	66.8	67.5	65.20	. .		
	48			36.0								62.0	55.5	61.3	62.5	60.33	. .		
	49	α	Canis Majoris	19.0	30.3	41.1	51.5	3.2	14.0	24.4	6 37 51.93	304 36 57.3	61.1	65.0	65.5	62.22	. .	29.834	43
	†50	ε	Canis Majoris	28.8	40.8	52.5	4.3	16.8	28.8	40.2	6 52 4.60	292 22 28.1	30.4	35.1	34.8	32.10	. .	29.838	43
8	51		Sun, 1st and N. L.	17.3	29.0	40.1	51.1	3.1	14.0	25.0	19 16 51.37	299 10 32.2	32.0	37.5	38.5	35.05	. .	29.933	45
	52		Venus, (Center)	39.0	49.0	59.8	10.2	21.0	32.0	42.2	22 23 10.46	311 8 21.0	21.5	24.5	23.4	22.60	. .	29.512	41

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 4h.	0s.
	s.	s.	s.	s.	
Jan. 5	—0.141	—0.358	—0.448	s 30.772	l .036
7	.141	.358	.448	32.468	.030
8	—0.141	—0.358	—0.448	s 32.950	l .020

* H. Professor Hubbard.
* P. Lieut. D. D. Porter.
1. Very tremulous. Corrections in Æ. doubtful.
15. Observed for Dec. at 1h. 57m. 49s., clock time.
30. Very unsteady; hardly worth recording.
36. Mercury disturbed by wind.
50. Cloudy.

RRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
0.05	—17 56.66	298 16 36.01	20.42	. .	— 0 0.49	. . .	— 22 49 4.84	. .	. .
0.00	+ 0 0.24	359 44 59.99	55.71	+ 30.43	0 1.00	18 31 42.13	+ 38 38 43.53	+ 9.25	+ 7.37
0.00	+14 33.81	298 29 57.01	. .	.45	0 0.47	19 5 26.16	— 22 36 19.45	. .	. .
0.03	— 0 44.57	309 50 54.51	. .	.55	0 0.52	22 14 28.66	— 11 15 21.95	. .	. .
0.00	0 27·43	335 26 6.12	61.36	.63	0 0.70	0 5 19.29	+ 14 19 44.01	11.70	72.18
0.16	0 44.85	323 3 26.85	. .	.64	0 0.59	0 24 58.95	+ 1 57 4.74	. .	. .
0.13	— 0 34.48	324 51 20.14	. .	.64	0 0.61	0 33 51.52	+ 3 44 58.03	. .	. .
0.10	+ 0 51.59	49 35 62.51	. .						
0.12	1 2.13	61.43	. .						
0.13	1 8.65	60.30	. .						
0.14	1 10.60	59.44	. .	.66	0 30.81	1 4 15.71	+ 88 29 38.57	44.94	53.84
0.13	1 7.88	61.06	. .						
0.12	1 0.74	60.48	. .						
0.10	0 49.35	59.53	. .						
0.15	+39 35.24	334 22 45.64	. .	.70	0 0.69	1 58 18.41	+ 13 16 23.53	. .	. .
0.01	— 0 44.80	323 41 21.89	. .	.71	0 0.61	2 35 20.97	+ 2 34 59.78	11.00	63.52
0.01	— 0 43.23	324 35 14.25	. .	.73	0 0.61	2 54 15.61	+ 3 28 52.14	10.99	59.88
0.01	+ 0 11.22	10 24 57.66	. .	.74	0 1.24	3 13 23.96	+ 49 18 35.55	14.29	43.63
0.06	— 0 16.70	344 43 48.38	. .	.76	— 0 0.78	3 38 22.42	+ 23 37 26.27	+ 12.19	+44.84
0.08	+ 1 58.27	62 50 36.14	. .	.77	+ 0 3.78	3 49 34.24	+ 78 15 45.97	— 2.96	—31.32
0.03	— 0 25.69	337 17 57.60	. .	.79	— 0 0.71	4 27 7.51	+ 16 11 35.49	+ 11.65	+34.09
0.01	+ 0 7.48	6 56 22.24	. .	.81	0 1.15	5 5 22.35	+ 45 50 0.13	14.67	17.65
0.01	— 0 11.30	349 34 32.14	. .	.82	0 0.85	5 16 36.04	+ 28 28 10.03	12.71	18.17
0.01	1 33.70	303 9 56.14	. .	.82	0 0.50	5 25 58.43	— 17 56 25.97	8.61	22.63
0.00	3 18.87	286 56 32.68	. .	.83	0 0.44	5 34 6.58	— 34 9 49.43	6.64	21.42
0.12	— 0 37.75	328 28 34.89	. .	.84	— 0 0.63	5 46 52.44	+ 7 22 12.78	+ 10.78	12.82
0.16	+ 1 34.65	54 30 28.21	. .						
0.14	1 29.74	31.10	. .						
0.13	1 26.94	30.92	. .						
0.13	1 26.09	29.80	. .	.86	+ 0 13.43	6 21 32.65	+ 86 35 51.08	— 50.29	+ 3.19
0.13	1 27.31	31.42	. .						
0.14	1 30.50	31.64	. .						
0.15	+ 1 35.50	33.10	. .						
0.02	— 1 29.04	304 35 41.08	. .	.86	— 0 0.50	6 38 24.05	— 16 30 41.03	+ 8.42	— 7.75
0.02	0 24.61	337 17 58.05	. .	32.47	— 0 0.71	4 27 7.43	+ 16 11 37.05	11.66	+34.15
0.08	0 7.21	173 3 35.03	60.24	.50	+ 0 7.56	5 5 22.58	+ 45 50 3.97	14.68	17.39
0.16	0 10.89	349 34 34.37	. .	.51	— 0 0.85	5 16 36.09	+ 28 28 13.37	12.71	18.10
0.02	0 48.44	320 41 5.40	. .	.51	0 0.58	5 24 10.46	— 0 25 15.60	10.21	21.07
0.15	0 49.99	319 47 52.44	. .	.51	0 0.58	5 28 26.12	— 1 18 28.56	10.12	19.96
0.04	3 11.21	286 56 28.28	. .	.51	0 0.44	5 34 6.51	— 34 9 52.72	6.65	21.97
0.20	— 0 36.30	328 28 34.88	. .	.52	— 0 0.63	5 46 52.22	+ 7 22 13.88	+ 10.82	12.99
0.24	+ 1 31.15	54 30 32.39	. .						
0.22	1 26.43	33.35	. .						
0.20	1 23.60	33.18	. .						
0.20	1 22.74	32.62	. .	.54	+ 0 13.43	6 21 34.01	+ 86 35 48.15	— 50.40	+ 6.36
0.21	1 23.96	32.95	. .						
0.22	1 27.17	32.59	. .						
0.24	+ 1 32.21	32.78	. .						
0.13	— 1 25.63	304 35 36.46	. .	.55	— 0 0.50	6 38 23.98	— 16 30 44.54	— 8.43	— 7.27
0.08	2 23.37	292 20 8.65	. .	.55	0 0.46	6 52 36.69	— 28 46 12.35	+ 7.20	— 7.30
0.43	17 54.07	298 52 40.55	60.82	.78	0 0.47	19 18 34.05	— 22 13 41.02	. .	. .
0.14	— 0 55.24	311 7 27.50	. .	+ 32.84	— 0 0.53	22 23 42.77	— 9 58 54.07	. .	. .

NADIR POINTS.				
A.	B.	C.	D.	Means
	Jan. 3.			° ′ **179 59**
18″5	18″5	21″4	22″0	20″10
19.5	19.5	22.0	22.0	20.75
19.2	18.8	21.9	22.0	20.48
18.7	19.3	22.0	21.5	20.37
18.97	19.02	21.82	21.88	20.42
	Jan. 5,	20*h*.		**179 59**
55.5	56.1	55.8	56.0	55.85
55.2	55.3	55.0	55.5	55.25
55.3	56.0	55.8	55.9	55.75
55.5	56.3	55.7	56.0	55.88
55.6	55.6	56.0	56.1	55.82
55.42	55.86	55.66	55.90	55.71
	Jan. 5,	1½*h*.		**179 59**
59.8	61.3	61.5	61.5	61.02
59.6	61.0	61.2	61.1	60.73
60.1	60.5	61.2	61.3	60.78
61.2	61.0	62.1	61.6	61.47
60.0	60.6	61.7	61.5	60.95
60.14	60.88	61.54	61.40	60.99
	Jan. 5,	5*h*.		**179 59**
60.8	61.3	62.5	62.0	61.65
60.4	61.6	62.4	62.0	61.60
60.5	62.0	62.8	62.5	61.95
60.5	61.8	62.7	62.2	61.80
60.6	61.5	62.5	62.1	61.68
60.56	61.64	62.58	62.16	61.74
	Jan. 7,	4½*h*.		**179 59**
59.3	60.5	60.3	61.0	60.28
59.3	60.2	61.0	60.8	60.32
59.6	60.8	60.8	61.5	60.68
59.0	60.1	60.8	60.5	60.10
59.0	60.3	60.4	61.2	60.22
59.24	60.38	60.66	61.00	60.32
	Jan. 7,	7¼*h*.		**179 59**
59.3	60.3	60.2	61.0	60.20
59.5	60.4	60.2	61.2	60.32
58.8	60.4	60.5	61.5	60.30
58.8	60.0	60.1	60.7	59.90
58.6	60.3	60.3	61.3	60.13
59.00	60.28	60.26	61.14	60.17

bject.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
n . .	+ 1 10.58	
nus .	+ 0 1.00	
ars .	+ 0 0.25	
oon .	+ 1 5.36	
n . .	+ 1 10.37	

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THERS.		Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.	Ex.	
			s.	s.	s.	s.	s.	s.	s.	h. m. s.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Jan. 8	†1	Mars, (Center,)	41.2	51.6	2.0	12.0	24.0	34.0	44.2	0 40 12.71	325 39 58.5	62.6	65.2	64.0	62.58	. .	29.953	45.0	39.6	P.
	2				31.0						49 34 56.5	55.2	49.5	56.5	54.42	. .				
	3					3.0					53.5	53.2	47.1	56.5	52.58	. .				
	4	Polaris					53.5			1 10 48.40	56.2	53.5	49.2	57.6	54.12	. .	29.953	44.0	40.0	
	5							35.5			63.4	61.1	55.7	63.8	61.00	. .				
	6								59.0		73.2	71.8	65.2	74.2	71.10	. .			39.6	
	7	Jupiter, 1st L.	..	..	11.2	..	..	..	..	1 57 11.20	331 54 24.9	26.9	28.0	27.0	26.70	. .	29.954	43.0	38.2	
	8	γ Ceti	17.2	27.5	38.9	48.8	59.0	9.5	19.6	2 34 48.64	323 42 5.0	8.5	8.4	9.5	7.85	. .	29.800	43.0	36.0	
	9	α Ceti	12.0	22.5	32.9	43.2	53.9	4.5	14.8	2 53 43.40	324 35 54.5	54.2	56.0	59.5	56.05	. .	30.000	42.5	35.0	
	10	α Persei	..	..	37.0	52.2	8.5	..	..	3 12 52.57	10 24 48.5	44.2	46.2	50.0	47.22	. .	30.000	42.0	35.0	
	11	η Tauri	16.1	27.2	38.9	49.8	1.5	13.2	24.4	3 37 50.16	344 43 7.5	10.2	10.0	10.7	9.60	. .			35.0	
	12	γ¹ Eridani	47.6	58.4	9.0	19.6	30.6	42.0	51.8	3 50 19.86	307 10 25.2	26.0	30.0	30.2	27.85	. .	30.000	41.5	34.0	
	13	α Tauri	3.0	13.5	24.5	35.0	46.3	57.0	8.0	4 26 35.33	337 17 23.4	27.0	27.5	26.5	26.10	. .	30.100	41.0	34.0	
	14	Moon, 1st and N. L.	43.0	54.0	5.0	17.1	28.9	40.0	50.9	4 35 17.56	340 54 41.0	43.5	44.0	46.7	43.80	. .	30.000	40.5	33.0	
	15	β Orionis	..	16.0	27.0	38.0	48.4	59.2	..	5 6 37.72	313 44 13.4	15.3	18.2	18.5	16 35	. .	30.000	40.0	33.6	
	16	β Tauri	28.5	40.0	52.0	4.0	16.0	28.0	39.5	5 16 4.00	349 34 49.0	53.5	48.5	54.0	51.25	. .	30.000	40.0	33.0	
	17	δ Orionis	6.8	17.0	27.2	38.2	48.8	39.2	9.0	5 23 38.03	320 41 58.0	59.5	61.5	63.5	60.63	. .			33.0	
	18	α Columbæ	56.0	8.4	21.0	33.5	47.0	59.4	11.5	5 33 33.83	287 0 45.3	48.5	50.9	52.1	49.20	. .	30.000	40.0	33.5	
10	19	Jupiter, 1st and S. L.	0.2	..	21.8	..	43.0	..	4.1	1 57 32.28	331 56 46.4	50.1	49.3	49.5	48.83	. .	29.832	38.5	29.8	H
	20	Jupiter, 2d L.	..	14.0	..	35.1	..	56.8	..	1 57 35.30										
	21	γ Ceti	16.0	26.3	36.8	47.1	58.0	8.4	18.4	2 34 47.29	313 42 1.2	5.3	5.6	5.0	4.28	. .	29.832	37.8	29.9	
	22	β Ursæ Minoris, S. P.	32.5	52.0	12.2	33.0	52.0	12.0	33.5	2 50 32.46	66 17 15.0	9.0	13.0	13.7	12.68	. .	29.824	37.2	30.2	
	23	α Persei	3.0	18.4	35.0	50.3	7.1	23.0	38.3	3 12 50.73	10 24 45.1	41.8	43.2	46.5	44.15	. .	29.810	37.0	29.8	
	24	η Tauri	14.8	26.0	37.2	48.5	0.3	11.6	23.0	3 37 48.77	344 43 59.5	62.8	60.7	63.0	61.50	. .	29.810	35.9	29.2	
	25	γ¹ Eridani	46.2	57.0	8.0	18.3	29.5	40.5	51.0	3 50 18.64	307 10 23.0	24.7	28.7	27.1	25.89	. .	29.800	35.8	29.2	
	26	Vesta	23.0	34.0	44.5	55.2	6.5	17.8	28.2	4 2 55.60	337 33 27.8	31.5	29.0	31.4	29.92	. .	29.792	35.0	29.2	
	27	α Tauri	1.2	12.1	23.0	33.6	45.0	55.8	6.1	4 26 33.83	337 18 16.0	21.8	21.5	22.3	20.40	. .	29.788	34.8	29.1	
	28	ε Ursæ Minoris, S. P.	57.5	40.2	22.0	5.5	45.2	27.0	12.5	5 1 5.70	58 47 53.3	49.7	51.5	53.9	52.10	. .	29.790	34.0	28.8	
	29	β Orionis	4.3	15.2	26.0	36.2	47.2	57.5	7.8	5 6 36.31	312 44 7.6	12.5	13.0	12.5	11.40	. .	29.790	34.0	29.1	
	30	β Tauri	27.0	39.0	50.8	2.5	15.0	27.0	38.1	5 16 2.77	349 34 40.6	43.5	41.4	44.4	42.48	. .	29.784	34.0	29.0	
	31	δ Orionis	5.8	15.8	26.4	36.5	47.5	58.0	8.1	5 23 36.87	320 41 50.4	54.3	56.0	56.0	54.18	. .	29.783	34.0	28.7	
	32	ε Orionis	20.2	30.4	41.0	51.2	2.2	12.6	22.5	5 27 51.44	319 48 36.0	38.3	43.8	44.2	40.58	. .	29.783	34.0	28.6	
	33	α Columbæ	54.4	7.3	19.2	32.2	45.3	58.2	10.0	5 33 32.37	286 59 42.1	42.9	47.1	45.1	44.30	. .	29.782	33.9	28.6	
	34	α Orionis	47.2	57.2	8.1	18.3	29.2	40.1	50.2	5 46 18.61	328 29 6.5	10.9	10.0	10.5	9.48	. .	29.782	33.7	28.7	
	35								59.0		54 28 57.0	52.0	57.6	59.0	56.40	. .				
	36							48.5			64.5	58.8	63.8	65.0	63.02	. .				
	37						46.0				67.3	61.8	66.7	67.8	65.90	. .				
	38	δ Ursæ Minoris, S. P.								6 20 43.75							29.778	33.3	27.7	
	39				41.0						69.2	62.8	68.8	68.5	67.32	. .				
	40			36.0							64.0	58.6	64.3	64.8	62.92	. .				
	41		32.0								61.1	54.5	60.1	59.8	58.88	. .				
	42	Moon, 1st L.	9.3	21.0	32.0	43.2	55.0	6.4	17.2	6 20 43.44							29.778	33.0	27.9	
	43	α Canis Majoris	17.5	28.5	39.3	50.0	1.4	12.1	22.8	6 37 50.23	304 37 1.4	2.5	6.8	6.5	4.30	. .	29.770	33.0	27.0	
12	44	Jupiter, 1st L.	26.0	36.2	47.0	57.0	8.9	19.2	29.4	1 57 57.67	332 1 26.7	26.7	25.9	26.4	26.42	. .	29.900	40.0	32.5	P.
	45	Jupiter, 2d L.	29.0	39.0	50.0	0.0	12.0	22.2	32.2	1 58 0.63										
	46	γ Ceti	16.0	26.4	37.0	47.2	57.9	8.4	18.5	2 34 47.34	323 42 3.6	7.7	7.4	7.5	6.55	. .	29.910	37.5	31.2	
	47	α Ceti	10.0	21.0	31.5	41.7	52.4	3.0	13.0	2 53 41.80	324 35 55.3	59.8	58.0	56.7	57.45	. .	29.920	37.5	30.5	
	48	α Persei	2.6	19.0	35.2	50.5	7.0	23.2	39.0	3 12 50.93	10 25 50.5	47.0	48.2	51.4	49.28	. .	29.920	37.0	28.8	
	49	η Tauri	14.5	26.2	38.0	49.0	0.5	11.9	22.9	3 37 49.00	344 44 9.0	12.5	11.5	13.2	11.55	. .	29.940	36.5	27.6	
	50	γ¹ Eridani	46.3	56.6	7.5	18.4	29.5	40.0	50.7	3 50 18.43	307 11 28.5	29.6	34.0	35.9	32.00	. .			27.3	
	51	α Tauri	1.2	12.0	23.1	33.5	45.0	56.0	6.3	4 26 33.87	337 18 25.5	29.5	29.4	29.7	28.52	. .	29.946	36.0	26.5	
	52	α Aurigæ	4.2	19.0	34.2	49.0	4.5	19.6	34.0	5 4 49.21	6 56 21.2	18.2	18.9	19.5	19.45	. .	29.950	35.0	27.0	

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 4h.	0s.
	s.	s.	s.	s.	
Jan. 8	—0.141	—0.358	—0.448	s 32.950	l .020
10	.141	.358	.448	34.204	.015
12	—0.141	—0.358	—0.448	s 34.254	l .017

1. Clamp working badly.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.14	− 0 36.92	325 39 25.80	60.82	+ 32.88	− 0 0.62	0 40 44.97	+ 4 33 4.23	. .	. .
0 0.00	+ 1 7.71	49 36 2.13	. .						
0 0.17	1 9.68	2.43	. .						
0 0.34	1 7.02	1.48	. .	.89	− 7 9.29	1 4 12.00	+ 88 29 38.98	+ 47.83	+53.69
0 0.50	0 59.75	1.25	. .						
+ 0 0.64	+ 0 48.49	0.23	. .						
− 0 0.06	− 0 31.11	331 55 55.53	. .	.91	+ 0 10.00	1 57 55.56	+ 10 47 33.01	. .	. .
− 0 0.02	0 43.69	323 41 24.14	. .	.92	− 0 0.61	2 35 20.95	+ 2 35 1.62	11.03	+63.76
+ 0 0.01	− 0 42.65	324 35 13.41	61.72	.93	0 0.61	2 54 15.72	+ 3 28 51.86	11.02	60.12
− 0 0.24	+ 0 11.04	10 24 59.02	. .	.93	0 1.27	3 13 24.23	+ 49 18 36.69	14.34	43.38
0 0.26	− 0 16.40	344 42 53.46	. .	.94	0 0.78	3 38 22.32	+ 23 37 30.94	12.21	44.86
− 0 0.36	1 19.20	307 9 8.39	. .	.95	0 0.51	3 50 52.30	− 13 57 14.13	9.57	51.77
+ 0 0.10	− 0 25.71	337 17 0.49	. .	.96	0 0.71	4 27 7.52	+ 16 11 37.97	11.66	34.19
− 0 0.13	+ 2 26.72	340 57 10.40	. .	.97	0 0.77	4 36 55.34	+ 19 50 47.88	. .	. .
+ 0 0.27	− 1 5.10	312 43 11.52	61.83	.97	0 0.57	5 7 10.12	− 8 23 11.00	9.57	28.02
+ 0 0.30	0 11.09	349 34 40.46	. .	.97	0 0.88	5 16 36.12	+ 28 28 17.94	12.71	18.05
0 0.00	0 49.38	320 41 11.25	. .	.98	0 0.58	5 24 10.43	− 0 25 11.27	10.21	21.19
− 0 0.23	3 14.50	286 57 34.93	. .	.98	0 0.44	5 34 6.37	− 34 9 47.59	6.65	22.23
+ 0 0.06	0 10.10	331 56 38.79	59.34	34.17	0 0.66	1 58 7.30	+ 10 50 18.98	. .	. .
− 0 0.02	− 0 44.30	323 41 19.96	. .	.18	− 0 0.61	2 35 20.86	+ 2 35 0.15	11.05	+63.91
+ 0 0.24	+ 2 16.44	66 19 29.36	. .	.19	+ 0 2.88	14 51 9.53	+ 74 46 50.45	2.26	−40.98
− 0 0.30	+ 0 11.08	10 24 54.93	. .	.19	− 0 1.24	3 13 23.69	+ 49 18 35.12	14.38	+43.21
+ 0 0.36	− 0 16.48	344 43 45.38	. .	.20	0 0.78	3 38 22.19	+ 23 37 25.57	12.23	44.87
− 0 0.04	1 19.50	307 9 6.35	. .	.20	0 0.51	3 50 52.33	− 13 57 13.46	9.59	52.05
0 0.16	0 24.93	337 33 4.83	. .	.20	0 0.71	4 3 29.09	+ 16 26 45.02	. .	. .
− 0 0.10	− 0 25.24	337 17 55.06	. .	.21	− 0 0.71	4 27 7.33	+ 16 11 35.25	+ 11.67	34.25
+ 0 0.04	+ 1 39.46	58 49 31.60	. .	.22	+ 0 5.83	17 1 45.75	+ 82 16 48.21	− 14.04	−14.26
+ 0 0.27	− 1 5.27	312 43 6.40	. .	.22	− 0 0.54	5 7 9.99	− 8 23 13.41	+ 9.58	+28.38
− 0 0.08	0 11.10	349 34 31.30	58.78	.22	0 0.85	5 16 36.14	+ 28 28 11.49	12.71	17.98
+ 0 0.03	0 49.42	320 41 4.79	. .	.22	0 0.58	5 24 10.51	− 0 25 15.02	10.21	21.43
− 0 0.20	0 51.01	319 47 49.37	. .	.23	0 0.58	5 28 25.09	− 1 18 30.44	10.12	20.35
+ 0 0.10	3 15.19	286 56 29.21	. .	.23	0 0.44	5 34 6.16	− 34 9 50.60	6.66	22.76
0 0.24	− 0 37.03	328 28 32.69	. .	.23	− 0 0.63	5 46 52.21	+ 7 22 12.88	+ 10.81	13.24
0 0.30	+ 1 33.18	54 30 29.88	. .						
0 0.28	1 28.37	31.67	. .						
0 0.27	1 25.53	31.70	. .						
			. .	.24	+ 0 13.43	18 21 31.42	+ 86 35 47.78	− 50.40	+ 6.31
0 0.25	1 25.86	33.43	. .						
0 0.28	1 29.07	32.27	. .						
+ 0 0.29	+ 1 34.08	33.25	. .						
			. .	.24	− 0 0.66	6 22 21.73	. . . . .	. .	. .
− 0 0.41	− 1 27.59	304 35 36.60	. .	.24	0 0.53	6 38 23.94	− 16 30 43.51	+ 8.42	− 6.56
+ 0 0.03	0 31.13	332 0 55.32	63.14	.22	0 0.66	1 58 32.71	+ 10 54 32.43	. .	. .
− 0 0.04	0 44.30	323 41 22.21	. .	.23	0 0.61	2 35 20.96	+ 2 34 58.52	11.07	+64.06
+ 0 0.02	− 0 42.94	324 35 14.53	. .	.23	0 0.61	2 54 15.42	+ 3 28 50.64	11.06	60.42
0 0.70	+ 0 11.15	10 26 1.13	. .	.24	0 1.24	3 13 23.93	+ 49 18 37.24	14.41	43.11
0 0.40	− 0 16.63	344 43 55.32	. .	.25	0 0.78	3 38 22.47	+ 23 37 31.43	12.25	44.89
+ 0 0.25	1 20.16	307 10 12.09	. .	.25	0 0.51	3 50 52.17	− 13 57 11.80	9.61	52.31
− 0 0.68	− 0 25.53	337 19 2.31	. .	.26	0 0.71	4 27 7.42	+ 16 11 38.42	11.69	34.31
+ 0 0.41	+ 0 7.42	6 56 27.28	. .	.27	− 0 1.15	5 5 22.33	+ 45 50 3.49	+ 14.70	+16.79

NADIR POINTS. A.	B.	C.	D.	Means
	Jan. 8,	Day.		° ′
				179 59
60″3	61″0	59″0	60″7	60″25
60.3	61.0	59.0	61.5	60.45
60.4	61.5	60.0	61.5	60.85
60.7	61.6	59.7	60.9	60.72
60.7	61.6	59.7	60.9	60.72
61.5	62.6	59.7	60.9	61.18
60.6	61.6	59.9	62.0	61.02
60.6	61.6	59.9	62.0	61.03
60.6	61.6	59.9	62.0	61.02
60.6	61.6	59.5	62.0	60.93
60.63	61.57	59.63	61.44	60.82
	Jan. 8,	2h.?		179 59
60.2	61.2	59.9	60.9	60.55
61.4	63.2	60.5	62.4	61.88
61.4	63.2	62.0	63.2	62.45
60.6	63.2	62.0	63.2	62.25
61.0	62.4	60.0	62.5	61.47
60.92	62.64	60.88	62.44	61.72
	Jan. 8,	6h.		179 59
62.6	64.7	63.5	64.0	63.70
60.7	64.5	63.5	63.5	63.05
59.7	62.5	58.5	61.5	60.55
60.6	61.5	58.4	62.9	60.85
60.5	61.5	59.3	62.9	61.05
60.2	62.5	60.6	62.9	61.55
60.2	62.5	60.1	62.9	61.42
61.0	62.5	60.1	62.9	61.65
61.5	62.5	60.9	63.5	62.10
61.4	63.7	61.0	63.6	62.42
60.84	62.84	60.59	63.06	61.83
	Jan. 10	1¾h.		179 59
59.5	59.7	59.5	59.3	59.50
58.8	59.5	59.2	59.0	59.12
59.0	59.6	59.6	59.6	59.45
58.9	59.3	59.6	59.3	59.28
59.05	59.52	59.48	59.30	59.34
	Jan. 10	6h.		179 59
58.5	59.2	58.5	58.5	58.68
58.3	58.6	58.7	59.5	58.77
58.0	58.7	58.8	59.8	58.82
58.0	58.6	59.0	59.7	58.83
58.3	58.8	59.0	59.2	58.83
58.22	58.78	58.80	59.34	58.78
	Jan. 12			179 59
60.4	61.0	62.8	62.0	61.55
61.5	63.0	62.8	64.0	62.82
61.5	63.0	62.8	64.0	62.83
62.5	65.0	64.0	65.2	64.18
63.5	64.5	62.5	65.5	64.00
62.5	64.5	62.5	63.0	63.12
62.5	64.5	62.5	64.5	63.50
62.06	63.64	62.81	64.03	63.14

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Jupiter .	+ 0 1.45	
Moon .	1 5.58	
Moon .	+ 1 4.71	

Jan. 8. Error of Runs +0″713.
" 10. do. do. 1.138.
" 12. do. do. +1.564.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°
Jan. 12	†1	δ Orionis	5.5	15.9	26.3	36.6	47.0	57.7	7.8	5 23 36.69	320 41 57.0	59.2	61.8	61.0	59.75	. .	29.954	35.0	28.0
	†2	α Orionis	47.0	59.0	8.0	19.0	29.0	..	50.0	5 46 15.33	328 29 8.2	10.9	11.1	11.2	10.35	. .	29.950	34.0	28.2
	†3	α Lyræ	28.4	42.0	55.2	8.3	22.0	35.3	48.5	18 31 8.53	359 44 61.3	61.3	59.0	62.0	60.90	. .	30.244	36.5	32.3
13	4	Sun, 1st and N. L. .	58.0	9.0	20.1	31.2	43.0	54.4	5.2	19 38 31.56	299 56 46.7	50.2	52.5	54.6	51.00	. .	30.840	37.0	33.3
	5	Venus, 1st and S. L. .	42.7	53.2	3.5	14.1	25.0	35.3	45.5	22 37 14.19	313 15 5.3	9.0	8.7	8.2	7.80	. .	30.230	38.9	33.4
	6	α Cassiopeiæ	20.0	38.4	57.0	15.3	34.5	53.0	11.2	0 31 15.63	16 47 54.2	48.8	50.3	54.2	51.88	. .	30.240	37.5	31.2
	7	β Ceti	44.2	55.2	6.3	17.2	28.5	39.8	50.5	0 35 17.39	302 16 53.2	54.5	56.5	59.9	56.02	. .			30.6
	8		10.0								49 34 75.0	65.0	67.7	70.0	69.42	. .	30.236	37.1	29.8
	9			46.0							62.8	52.6	55.7	59.4	57.62	. .			
	10				25.0						54.7	44.5	49.0	52.2	50.10	. .			
	11	Polaris				58.0				1 4 5.14	53.5	42.2	47.2	49.5	48.10	. .	.238	36.8	29.3
	12						48.0				53.5	43.5	48.5	51.0	49.12	. .			
	13							32.0			62.8	53.0	56.2	59.3	57.83	. .			
	14								57.0		73.2	63.0	67.5	69.5	68.37	. .	.236	36.0	29.0
	15	α Ceti	9.6	20.1	30.5	41.3	52.0	2.2	12.5	2 53 41.17	324 35 53.0	53.7	57.0	57.4	55.28	. .	30.240	33.8	24.7
	16	η Tauri	14.0	25.2	36.3	48.0	59.8	11.0	22.4	3 37 48.10	344 44 4.8	8.4	6.3	9.0	7.12	. .	30.290	33.0	24.1
	17	γ¹ Eridani	45.5	56.5	7.0	18.0	28.2	39.5	50.2	3 50 17.84	307 10 25.0	26.9	31.2	30.3	28.35	. .	30.232	32.5	24.7
	†18	Vesta	38.0	..	59.2	10.2	22.0	32.0	43.0	4 2 14.07	337 42 18.6	21.2	18.5	21.9	20.05	. .	30.232	32.0	23.7
	19	α Aurigæ	..	18.5	33.8	48.2	4.0	19.0	33.5	5 4 56.17	6 56 15.3	14.8	14.0	17.8	15.48	. .	30.236	31.5	21.5
	20	β Tauri	26.2	38.0	50.2	1.5	12.5	25.0	36.3	5 16 1.39	349 34 37.3	43.5	41.2	44.4	41.60	. .	30.282	31.0	22.6
	21	α Leporis	51.0	2.0	13.0	23.8	35.0	46.0	57.0	5 25 23.97	303 11 24.1	27.3	29.6	31.0	28.00	. .			23.2
	22	α Columbæ	54.0	6.5	19.0	31.5	45.0	57.3	9.8	5 33 31.87	286 59 42.5	45.2	49.0	47.5	46.05	. .	30.236	30.4	22.8
	23	α Orionis	46.2	57.0	7.2	17.8	28.5	39.0	49.2	5 46 17.84	328 29 4.1	9.0	9.1	10.3	8.12	. .	30.232	29.7	22.5
	24	α Canis Majoris . . .	16.8	27.8	38.7	49.0	0.3	11.5	22.0	6 37 49.44	304 37 58.7	63.5	68.4	68.5	64.78	. .	30.236	28.8	22.8
	25	ε Canis Majoris . . .	26.4	38.2	50.2	2.2	14.0	26.4	37.9	6 52 2.19	292 22 31.2	33.9	39.5	39.8	36.10	. .	30.230	28.4	22.4
	26	δ Geminorum	..	0.8	12.0	23.2	35.0	46.5	57.2	7 10 29.12	343 22 1.5	5.4	4.4	7.5	4.70	. .	30.226	28.0	22.0
	†27	α² Geminorum, (ref.). .	36.5	49.0	..	..	26.5	39.0	50.5	7 24 16.30	186 40 26.3	28.8	28.0	27.6	27.68	. .	30.228	28.0	21.4
	28	β Geminorum	45.6	57.5	9.5	21.3	33.3	45.5	57.2	7 35 21.41	349 29 46.5	52.3	48.8	52.8	50.02	. .			22.0
	29	15 Argus	52.5	4.0	15.5	26.4	38.4	50.0	1.0	8 0 26.83	297 16 13.1	15.5	21.3	20.0	17.48	. .	30.216	27.5	21.7
	†30	ϑ Cancri	43.0	54.0	5.3	16.0	27.3	38.0	49.4	8 22 16.29	339 43 3.7	9.5	8.3	8.6	7.52	. .	30.218	27.5	22.2
	31	δ Cancri	50.8	1.6	12.0	23.2	34.3	45.6	56.3	8 35 23.40	339 49 23.6	28.0	28.7	31.2	27.88	. .	30.212	27.3	22.2
	†32	Moon, S. L.	..	..	..	..	..	..	..	8 51 ..	332 49 29.0	35.1	37.5	37.0	34.65	. .	30.210	27.3	21.6
	33	κ Cancri	19.8	30.5	41.0	51.5	2.5	13.4	23.8	8 58 51.79	332 23 34.4	41.0	41.6	42.5	39.88	. .			21.0
	34	α Cephei, S. P. . . .	22.3	0.0	37.2	16.0	53.1	31.0	9.2	9 14 15.54	79 4 45.5	41.3	43.0	46.5	44.08	. .	30.214	27.0	21.6
	35	ξ Leonis	34.0	44.5	55.5	6.0	17.2	27.8	38.4	9 23 6.20	333 5 18.2	23.6	23.5	23.1	22.10	. .	30.218	27.0	21.8
	36	ε Leonis, (ref.) . . .	..	..	..	33.0	44.5	56.0	7.0	9 36 50.12	194 24 49.5	51.8	52.6	50.6	51.12	. .	30.224	27.0	21.6
	37	α Ursæ Majoris, (ref.) .	30.0	52.8	15.2	37.8	1.0	23.8	45.5	10 53 38.01	156 19 34.8	38.0	37.0	39.8	37.40	. .	30.202	27.5	19.0
	38	α Lyræ	28.4	41.5	55.0	8.2	22.0	35.5	48.3	18 31 8.41	359 45 3.0	2.4	0.0	3.5	2.22	. .			36.5
14	39	Sun, 1st and N. L. .	..	..	39.0	49.6	1.0	12.6	23.0	19 43 1.04	300 8 16.2	20.0	22.0	23.0	20.30	. .	30.114	37.0	39.0
	40	Venus, 1st L.	..	..	41.0	51.0	1.5	12.7	22.5	22 40 1.72	313 40 31.5	32.5	37.8	36.0	34.45	. .			43.5
	41		5.0								49 34 77.2	75.5	72.0	76.1	75.20	. .			
	42			44.5							64.6	62.5	60.2	67.0	63.58	. .			
	43				22.0						57.5	55.5	51.5	58.0	55.62	. .			
	†44	Polaris				57.5				1 4 1.50	57.5	54.5	50.2	58.5	55.18	. .	30.100	41.0	37.5
	45						46.0				59.0	56.0	51.5	60.5	56.75	. .			
	46							26.0			65.0	63.5	59.3	66.2	63.50	. .			
	47								49.5		75.5	72.5	71.5	76.5	74.00	. .			
	48	Jupiter, 1st and 2d L.	53.0 55.8	3.2 6.8	14.0 17.2	25.0 27.8	35.0 38.2	46.0 49.0	56.2 59.3	1 58 26.18	332 4 20.3	21.0	22.0	23.5	21.70	. .	30.100	40.0	35.0
	49	γ Ceti	15.0	25.6	35.9	46.2	57.0	7.5	17.4	2 34 46.37	323 42 9.4	10.6	8.5	8.9	9.35	. .	30.110	39.5	33.0
	50	α Ceti	9.5	20.0	30.4	40.9	51.6	2.0	12.5	2 53 40.99	324 35 55.2	62.5	61.0	62.8	60.38	. .	30.110	39.0	31.6
	51	α Persei	1.5	18.0	33.4	49.8	6.0	22.0	38.2	3 12 49.84	10 24 52.0	48.5	48.5	54.5	50.88	. .	30.110	39.0	31.5

DATE.	VALUE OF m.	n.	c.	CLOCK. At 5h.	H. Rate. 0s.
	s.	s.	s.	s.	
Jan. 13	—0.141	—0.358	—0.448	35.004	l .018
14	—0.141	—0.358	—0.448	35.226	l .021

1. Clouds passing over.
2. Unsteady. Clouded.
3. Unsteady.
18. Exceedingly faint.
27. Mercury agitated by the wind.
30. Exceedingly unsteady ; hardly worth observing.
32. Observed for declination at 51*m*. 50*s*.
44. Star very steady, and well defined ; atmosphere hazy.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
− 0 0.44	− 0 49.54	320 41 9.77	. .	+ 34.28	− 0 0.58	5 24 10.39	− 0 25 14.12	+ 10.22	+21.67
+ 0 0.36	0 37.30	328 28 33.41	. .	.28	+ 0 2.92	5 46 52.53	+ 7 22 9.52	10.81	13.42
0 0.00	0 0.26	359 44 60.64	60.73	.81	− 0 1.00	18 31 42.34	+ 38 38 39.16	9.16	9.81
+ 0 0.05	17 54.44	299 38 56.61	. .	.83	0 0.47	19 40 15.90	− 21 27 24.87	. .	. .
− 0 0.03	− 0 35.60	313 14 32.17	. .	.89	0 0.54	22 37 49.65	− 7 51 49.30	. .	. .
+ 0 0.05	+ 0 18.42	16 48 10.35	. .	.92	0 1.46	0 31 49.09	+ 55 41 49.74	12.28	60.09
0 0.02	− 1 36.46	303 10 19.58	. .	.92	0 0.50	0 35 51.81	− 18 50 1.00	11.68	83.30
0 0.24	+ 0 52.36	49 35 62.02	. .						
0 0.29	− 1 3.30	61.04	. .						
0 0.32	+ 1 9.87	60.29	. .						
0 0.34	1 11.81	60.25	. .	.93	0 30.81	1 4 9.26	+ 88 29 40.52	51.86	53.46
0 0.33	1 9.12	58.57	. .						
0 0.29	1 1.81	59.93	. .						
0 0.24	+ 0 50.26	58.87	. .						
0 0.02	− 0 43.93	324 35 11.37	. .	.96	0 0.61	2 54 15.52	+ 3 28 50.76	11.08	60.50
+ 0 0.25	0 16.93	344 43 50.44	. .	.97	0 0.78	3 38 22.29	+ 23 37 29.83	12.26	44.90
− 0 0.41	1 21.40	307 9 6.54	. .	.98	0 0.51	3 50 52.31	− 13 57 14.07	9.63	52.45
− 0 0.10	− 0 25.43	337 41 54.52	. .	.98	0 4.35	4 2 44.70	+ 16 35 33.91	. .	. .
+ 0 0.21	+ 0 7.57	6 56 23.26	59.86	35.00	0 8.65	5 5 22.52	+ 45 50 2.65	14.71	16.68
− 0 0.48	− 0 11.43	349 34 30.82	. .	.00	0 0.85	5 16 35.54	+ 28 28 10.21	12.72	17.87
+ 0 0.15	1 34.64	303 9 53.51	. .	.01	0 0.50	5 25 58.48	− 17 56 27.10	8.63	24.33
0 0.07	3 20.80	286 56 25.32	. .	.01	0 0.44	5 34 6.44	− 34 9 55.29	6.69	23.53
+ 0 0.25	0 38.08	328 28 30.29	. .	.02	0 0.63	5 46 52.23	+ 7 22 9.68	10.82	+13.50
− 0 0.31	1 29.77	304 35 34.70	. .	.03	0 0.50	6 38 23.97	− 16 30 45.91	8.41	− 5.88
0 0.46	2 29.99	292 20 5.65	. .	.04	0 0.46	6 52 36.77	− 28 46 14.96	7.18	5.60
0 0.31	− 0 18.60	343 21 45.93	. .	.04	0 6.42	7 10 57.74	+ 22 15 25.18	11.96	13.46
− 0 0.42	+ 0 7.30	186 40 34.56	. .	.05	0 2.37	7 24 48.98	+ 32 13 4.55	12.77	17.99
+ 0 0.03	− 0 11.53	349 29 38.52	. .	.05	0 0.85	7 35 55.61	+ 28 23 17.91	12.23	20.74
− 0 0.36	2 0.20	297 14 16 92	. .	.06	0 0.47	8 1 1.42	− 23 52 3.69	7.93	29.19
0 0.32	0 22.97	339 42 44.23	. .	.06	0 0.73	8 22 50.62	+ 18 36 23.62	11.46	33.01
0 0.42	− 0 22.83	339 49 4.63	. .	.07	0 0.73	8 35 57.74	+ 18 42 44.02	11.45	36.30
0 0.45	+38 47.95	333 28 22.15	. .	.07	. .	. . .	+ 12 22 1.54	. .	. .
0 0.10	− 0′32.60	332 23 7.18	. .	.07	− 0 0.66	8 59 26.20	+ 11 16 46.57	10.89	−42.69
− 0 0.50	+ 5 13.65	79 9 57.23	59.88	.08	+ 0 1.58	9 14 52.10	+ 61 56 22.93	6.38	+40.45
+ 0 0.18	− 0 31.60	333 4 50.68	. .	.08	− 0 0.67	9 23 40.61	+ 11 58 30.07	10.93	−48.03
− 0 0.25	+ 0 16.00	194 25 6.87	. .	.09	− 0 17.12	9 37 8.09	+ 24 28 32.24	11.63	48.96
0 0.46	− 0 27.41	156 19 9.53	61.46	.11	+ 0 0.23	10 54 13.35	+ 62 34 29.58	13.08	−54.18
0 0.00	0 0.25	359 45 1.97	. .	+ 35.03	− 0 1.00	18 31 42.44	+ 38 38 39.76	9.14	+10.11
0 0.22	17 52.09	299 50 30.21	. .	.03	0 11.69	19 44 34.37	− 21 16 54.00	. .	. .
0 0.00	− 0 49.24	313 39 45.21	. .	.09	0 11.08	22 40 26.85	− 7 26 37.00	. .	. .
+ 0 0.62	+ 0 48.65	49 36 4.47	. .						
0 0.53	1 0.55	4.66	. .						
0 0.49	1 7.62	6.73	. .						
0 0.49	1 10.23	5.90	. .	.14	0 30.81	1 4 5.83	+ 88 29 42.76	52.76	53.46
0 0.48	1 8.31	5.54	. .						
0 0.53	1 0.27	4.30	. .						
0 0.62	+ 0 51.19	5.81	. .						
0 0.56	− 0 30.46	332 2 51.24	. .	.16	0 0.66	1 59 0.68	+ 10 56 28.94	. .	. .
0 0.46	0 44.32	323 41 25.49	. .	.17	0 0.61	2 35 20.93	+ 2 35 3.19	11.10	64.21
0 0.47	− 0 43.01	324 35 21.12	. .	.18	0 0.61	2 54 15.56	+ 3 28 55.54	11.09	60.56
+ 0 0.07	+ 0 14.12	10 25 5.07	. .	.19	− 0 1.24	3 13 23.79	+ 49 18 42.77	+ 14.45	+42.97

NADIR POINTS. A.	B.	C.	D.	Means
				° ′
	Jan. 13	Day.		179 59
59″5	61″3	61″8	61″6	61″05
59.6	61.0	61.6	61.3	60.88
59.7	60.5	60.4	61.1	60.42
59.3	60.6	61.2	61.2	60.58
59.5	60.7	61.5	61.1	60.70
59.52	60.82	61.30	61.26	60.73
	Jan. 13	4¼h.		179 59
59.8	63.3	59.5	60.6	60.05
59.3	60.0	59.5	60.5	59.82
59.3	59.6	60.5	60.5	59.93
59.4	59.5	59.3	60.3	59.70
58.5	59.3	60.3	61.0	59.78
59.26	59.80	59.78	60.58	59.86
	Jan. 13	10½h.		179 59
57.8	60.5	60.5	61.2	60.00
57.5	59.6	60.5	60.2	59.45
57.5	59.8	60.8	64.4	59.62
58.0	59.9	60.4	61.0	59.83
57.9	60.0	61.3	61.0	60.50
57.74	59.96	60.87	60.95	59.88
	Jan. 14	Day.		179 59
59.5	62.8	61.1	62.3	61.42
59.2	62.8	61.1	63.0	61.53
59.2	62.8	61.1	63.0	61.52
59.2	62.8	61.1	63.0	61.53
60.0	62.8	61.1	63.0	61.72
60.0	62.8	61.1	63.0	61.73
58.9	62.8	60.5	61.7	60.98
58.9	62.7	61.2	62.3	61.27
59.36	62.79	61.04	62.66	61.46
	Jan. 14	Night.		179 59
60.5	62.2	59.5	61.7	60.98
60.5	62.2	59.5	61.1	60.95
61.2	62.3	60.6	61.7	61.45
60.0	62.3	60.5	61.6	61.15
60.5	63.8	61.8	63.2	62.33
62.0	63.2	60.4	62.8	63.05
60.6	62.2	61.1	62.8	61.68
60.6	62.2	61.1	62.8	61.67
60.6	62.2	61.1	62.8	61.68
60.75	62.62	60.62	62.22	61.55
	Jan. 15	Day.		179 59
60.1	61.3	61.6	62.6	61.40
60.0	61.0	61.8	61.6	61.10
60.2	61.4	62.0	62.2	61.45
59.8	60.8	62.0	62.2	61.20
59.2	60.2	61.7	61.8	60.72
61.14	60.74	61.82	62.08	61.17

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Sun . .	+ 1 9.98	
Venus .	0 1.11	
Sun . .	1 9.89	
Venus .	+ 0 1.12	

Jan. 13. Error of Runs +0″858.
" 14. do. do. +0.900.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Jan. 14	1	η Tauri	14.0	25.0	36.0	47.8	59.5	10.9	22.2	3 37 47.91	344 44 10.0	11.1	9.0	12.0	10.52	. .		38.0	30.0	P.
15	2	Sun, 1st and N. L.	33.5	45.0	56.1	7.2	18.8	30.0	41.0	19 47 7.37	300 18 9.5	11.7	14.0	14.0	12.30	. .	30.058	35.9	40.2	H.
18	3	α Lyræ	25.0	38.3	52.0	4.8	18.8	32.0	45.2	18 31 5.16	359 45 0.0	0.0	0.4	0.8	00.30	. .	30.426	29.0	26.2	
19	†4	Sun, 1st and N. L.	36.0	46.2	58.0	9.4	21.0	32.0	43.2	20 4 9.40	301 5 45.4	48.4	51.5	51.2	49.13	. .	30.406	30.5	28.4	
	5	Venus, 1st and S. L.	9.0	19.3	30.0	40.1	51.2	1.3	11.5	22 51 40.34	315 43 45.5	48.3	53.4	51.6	49.70	. .	30.374	31.1	28.6	
	6			39.0							49 34 61.8	50.5	56.9	57.6	56.70	. .	30.384	31.0	27.0	
	7				17.0						51.2	42.8	49.5	50.2	48.43	. .				
	8	Polaris				49.0				1 7 14.83	50.2	40.5	47.5	48.7	46.72	. .	30.376	30.8	26.1	
	9						38.0				54.0	43.9	51.2	52.4	50.38	. .				
	10							19.0			59.6	51.0	57.4	59.0	56.75	. .				
	11								47.0		73.4	64.0	70.0	70.7	69.52	. .	30.382	30.3	25.5	
	12	α Arietis	19.3	31.0	42.5	53.1	5.2	16.2	28.5	1 57 53.69	343 50 33.9	36.1	39.5	40.5	37.50	. .	30.384	29.8	24.6	
	13	γ Ceti	11.2	22.0	32.3	42.5	53.2	4.0	14.1	2 34 42.76	323 42 0.0	4.0	6.4	4.6	3.75	. .	30.392	29.8	23.5	
	14	α Ceti	6.0	16.4	27.0	37.2	48.0	58.5	9.0	2 53 37.44	324 35 50.0	55.6	47.2	58.3	55.28	. .	30.396	29.5	22.9	
	15	α Persei, (ref.)	57.2	13.1	29.1	45.2	1.0	18.0	33.1	3 12 45.24	169 35 6.3	8.0	8.5	7.9	7.68	. .	30.396	29.1	22.7	
	16	η Tauri, (ref.)	..	..	..	..	..	..	..	. . . . .	195 15 48.4	51.5	53.0	50.7	50.90	. .	30.400	29.1	20.8	
	17	γ^1 Eridani	41.8	52.5	3.1	14.0	25.1	36.0	46.4	3 50 14.13	307 10 23.4	36.7	34.0	32.2	31.58	. .	30.400	29.0	20.0	
	†18	α Tauri	57.0	7.3	18.6	29.0	40.2	51.2	2.1	4 26 29.34	397 18 18.8	24.0	26.4	25.5	23.68	. .	30.408	28.2	18.5	
	19	ε Ursæ Minoris, S. P.	9.5	24.3	43.0	3.5	19.0	37.5	45.5	5 1 3.19	58 47 49.5	45.0	49.8	48.4	48.18	. .	30.400	27.8	19.5	
	20	β Orionis	0.5	11.0	21.5	32.0	43.0	53.0	4.0	5 6 32.14	312 44 6.4	12.0	14.1	11.7	11.05	. .	30.404	27.7	19.3	
	21	β Tauri	22.5	35.0	46.5	58.0	10.3	22.2	34.0	5 15 58.36	349 34 43.5	44.0	46.2	45.2	44.72	. .	30.412	27.2	29.0	
	22	α Leporis	47.2	58.4	9.0	20.0	31.1	42.2	53.0	5 25 20.13	303 11 23.9	28.0	32.3	31.2	28.85	. .	30.414	27.0	18.0	
	23	α Columbæ	50.0	3.0	15.5	28.0	41.6	53.6	6.0	5 33 28.16	286 59 48.5	49.5	56.5	52.5	51.75	. .	30.415	26.7	17.8	
	24	α Orionis	42.5	53.2	3.5	14.0	25.2	35.3	46.0	5 46 14.24	328 29 9.2	12.0	13.8	12.0	11.90	. .	30.416	26.5	17.6	
	†25	μ Geminorum, (ref.)	28.2	39.2	..	..	..	..	..	6 12 33.70	196 18 14.8	15.4	19.0	14.8	16.00	. .	30.422	26.5	17.0	
	26	α Canis Majoris	11.8	22.3	34.0	44.3	55.2	6.2	17.2	6 37 44.43	304 37 1.5	6.8	13.3	10.5	8.02	. .	30.420	27.0	16.4	
	27	ε Canis Majoris	22.4	34.0	46.2	58.0	10.5	22.2	34.1	6 51 58.20	291 22 32.8	36.2	44.1	43.2	39.08	. .	30.418	26.8	16.4	
22	28	Venus, 1st L.	15.0	25.3	36.2	46.6	57.0	7.7	18.0	22 57 46.54	316 55 29.2	31.6	37.5	35.5	33.45	. .	30.370	35.0	31.0	P.
	29	Jupiter, 1st and 2d L.	10.0	20.2	31.0	42.4	52.0	3.0	13.5	2 0 43.14	332 18 29.0	30.0	32.8	31.2	30.75	. .	30.350	31.5	25.5	
	30		12.6	23.2	34.0	44.5	35.0	6.0	16.5											
	31	α Ceti	..	..	..	36.5	..	..	..	2 53 36.50	324 35 54.2	58.5	58.7	60.0	57.85	. .	30.362	31.5	22.7	
	†32	α Persei	57.1	13.0	29.5	45.0	1.5	17.4	33.0	3 12 45.21	10 24 48.0	42.8	47.1	48.5	46.60	. .	30.364	31.5	21.9	
	33	η Tauri	9.2	20.5	32.1	43.0	54.8	6.5	17.5	3 37 43.37	344 44 6.7	7.4	7.0	7.5	7.15	. .			23.0	
	34	γ^1 Eridani	40.8	51.7	2.5	13.0	24.1	34.8	45.0	3 50 13.13	307 10 28.5	28.2	33.0	33.0	30.68*d*	. .			23.0	
	35	α Tauri	56.0	6.8	17.2	28.0	39.2	50.5	1.0	4 26 28.39	337 18 19.4	23.4	24.0	23.5	22.47	. .	30.364	30.2	23.0	
	36	β Orionis	59.5	10.0	20.5	31.0	42.0	32.6	2.5	5 6 31.16	312 44 12.4	13.3	18.0	18.0	15.42	. .	30.360	29.5	23.5	
	37	β Tauri	21.8	33.4	45.5	57.0	9.0	21.3	32.7	5 15 57.24	349 34 45.5	45.8	43.8	47.2	45.58	. .			23.4	
	38	δ Orionis	59.5	10.5	21.0	31.5	42.0	52.5	2.6	5 23 31.37	320 41 52.5	52.7	57.0	58.1	55.07	. .	30.351	29.5	23.2	
	39	α Lyræ	23.4	37.0	50.1	3.3	17.0	30.5	43.3	18 31 3.51	359 44 56.5	54.4	53.5	54.5	54.73	. .	30.536	27.7	25.0	H.
23	†40	Sun, 1st and N. L.	..	39.5	50.0	1.0	12.2	24.0	34.2	20 21 6.82	301 59 28.4	31.3	36.0	34.5	32.55	. .	30.496	30.4	29.5	
	41	Venus, 1st and S. L.	5.5	16.2	26.4	37.1	48.0	58.3	8.4	22 59 37.13	317 18 22.5	26.0	31.8	27.5	26.95	. .	30.428	32.7	30.6	
	42				14.0						49 34 55.0	41.2	49.4	49.4	48.75	. .	30.424	31.0	27.7	
	43					47.0					52.4	38.8	47.2	47.1	46.37	. .				
	44	Polaris					45.0			1 10 32.80	54.3	41.3	49.2	49.2	48.50	. .				
	45							16.0			60.6	49.5	55.4	55.3	55.20	. .				
	46								42.0		71.8	61.0	66.8	67.1	66.68	. .	30.422	31.0	26.7	
	47	α Arietis	18.0	29.5	40.5	51.5	3.3	14.8	26.0	1 57 51.94	343 50 33.5	34.5	36.1	35.4	34.88	. .	30.320	30.5	24.6	
	48	Jupiter, 1st, 2d & S. L.	29.8	..	51.0	..	12.2	..	34.0	2 1 3.14	332 20 12.0	15.5	17.6	15.7	15.20	. .				
	49		..	43.2	..	4.4	..	26.0	..											
	50	γ Ceti	9.5	20.0	30.5	41.0	51.8	2.2	12.3	2 34 41.04	323 41 59.8	63.1	65.0	62.2	62.52	. .	30.410	30.0	21.9	
	51	16 Persei, B. A. C.	35.3	48.8	2.0	15.2	28.5	42.0	54.5	2 40 15.19	358 47 18.3	19.4	19.4	18.5	18.90	. .				
	52	α Ceti	4.3	14.5	25.0	35.2	46.1	56.7	7.0	2 53 35.54	324 35 52.0	55.8	57.8	56.5	55.52	. .	30.414	30.0	20.5	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 5*h*.	H. Rate. 0*s*.
	s.	s.	s.	s.	
Jan. 19	—0.141	—0.358	—0.448	*s* 38.721	*l* .022
22	.141	.358	.448	39.657	.021
23	—0.141	—0.358	—0.448	*s* 40.456	*l* .017

4. Exceedingly unsteady and ill defined.
18. Exceedingly unsteady.
25. Mercury agitated by the wind.
32. Unsteady.
40. Disturbed by persons entering the room.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.06	— 0 16.58	344 43 54.00	61.55	+ 35.20	— 0 0.78	3 38 22.33	+ 23 37 31.64	+ 12.27	+44.92
0 0.00	17 50.95	300 0 21.35	61.17	. .	0 0.47	. . .	— 21 6 0.57	. .	. .
0 0.00	0 0.25	359 44 59.75	62.71	38.49	0 1.00	18 31 42.65	+ 38 38 36.59	9.06	11.60
— 0 0.02	17 48.99	300 48 0.12	. .	.52	0 0.48	20 5 56.85	— 20 18 23.35	. .	. .
— 0 0.26	0 27.75	316 43 21.69	. .	.55	0 0.55	22 52 19.62	— 5 23 1.76	. .	. .
+ 0 0.39	1 4.07	49 35 61.16	. .						
0 0.44	1 4.57	59.44	. .						
0 0.46	1 10.65	59.83	. .	.64	3 50.11	1 4 3.36	+ 88 29 42.35	57.02	53.67
0 0.43	1 9.99	60.80	. .						
0 0.39	1 2.80	59.94	. .						
0 0.31	0 51.42	61.25	. .						
+ 0 0.14	0 18.02	343 50 19.62	. .	.65	0 0.78	1 58 31.56	+ 22 43 59.90	12.19	63.27
— 0 0.02	0 44.77	323 41 18.96	. .	.67	0 0.61	2 35 20.82	+ 2 34 55.51	11.16	64.57
+ 0 0.03	0 44.38	324 35 10.93	57.99	.67	— 0 0.61	2 54 15.50	+ 3 28 52.19	11.15	60.93
+ 0 0.38	— 0 11.48	169 34 56.58	. .	.68	+ 0 0.17	3 13 23.09	+ 49 18 40.66	14.56	42.73
— 0 0.28	+ 0 17.12	195 16 7.75	. .	. .	. . .	. . .	+ 23 37 29.49	. .	45.00
0 0.25	— 1 22.67	307 9 8.66	. .	.69	— 0 0.51	3 50 52.31	— 13 57 10.08	9.70	53.17
— 0 0.14	— 0 26.35	337 17 57.19	. .	.71	— 0 0.71	4 27 7.34	+ 16 11 38.45	+ 11.73	+34.55
+ 0 0.07	+ 1 43.52	58 49 31.77	. .	.72	+ 0 5.83	5 1 47.74	+ 82 16 46.97	— 15.86	—11.63
0 0.32	— 1 8.01	312 43 3.36	. .	.72	— 0 0.54	5 7 10.32	— 8 23 15.33	+ 9.63	+29.65
0 0.48	0 11.58	349 34 33.61	. .	.73	0 0.85	5 16 36.24	+ 28 28 14.86	12.75	17.69
0 0.20	1 36.24	303 11 28.85	. .	.73	0 0.50	5 25 58.36	— 17 56 25.93	8.67	25.45
+ 0 0.06	3 24.20	286 56 27.61	. .	.73	0 0.44	5 34 6.45	— 34 9 51.13	6.74	25.01
— 0 0.32	— 0 38.72	328 28 33.50	. .	.74	— 0 0.63	5 46 52.35	+ 6 22 14.76	10.83	13.96
0 0.10	+ 0 18.50	196 18 34.40	. .	.75	+ 0 28.45	6 13 40.90	+ 22 35 2.84	12.12	+ 2.67
0 0.43	— 1 31.54	304 35 36.05	. .	.76	— 0 0.50	6 38 22.69	— 16 30 42.69	8.41	— 4.59
0 0.14	2 32.87	292 20 6.07	. .	.76	0 0.46	6 52 36.50	— 28 46 12.67	7.18	— 3.96
0 0.00	0 25.08	316 55 8.37	60.89	39.53	0 0.55	22 58 26.77	— 4 11 12.82	. .	. .
— 0 0.08	0 31.72	332 17 59.11	60.44	.60	0 0.67	2 1 22.07	+ 11 11 37.84	. .	. .
+ 0 0.01	— 0 44.30	324 35 14.02	. .	.61	0 0.43	2 54 15.68	+ 3 28 52.38	11.19	+61.14
+ 0 0.12	+ 0 11.48	10 24 58.20	. .	.62	0 1.24	3 13 23.59	+ 49 18 38.34	14.62	42.64
— 0 0.08	— 0 17.02	344 43 50.05	. .	.63	0 0.78	3 38 22.22	+ 23 37 28.41	12.37	45.06
0 0.00	1 22.05	307 9 8.63	. .	.63	0 0.51	3 50 52.25	— 13 57 13.01	9.72	53.53
— 0 0.09	0 26.07	337 17 56.31	. .	.64	0 0.71	4 27 7.32	+ 16 11 35.12	11.77	34.65
+ 0 0.25	1 7.32	312 43 8.35	. .	.66	0 0.54	5 7 10.28	+ 8 23 12.84	9.65	30.03
0 0.08	0 11.44	349 34 34.22	. .	.66	0 0.85	5 16 36.05	+ 28 28 13.03	12.77	17.60
0 0.03	0 50.98	320 41 4.09	. .	.67	0 0.57	5 24 10.47	— 0 25 17.13	10.27	22.77
0 0.03	0 0.25	359 44 54.73	. .	40.28	0 1.00	18 31 42.79	+ 38 38 35.12	8.99	12.75
0 0.00	17 47.18	301 41 45.37	58.64	.31	0 6.02	20 22 50.09	— 19 24 35.82	. .	. .
0 0.00	— 0 23.83	317 18 3.12	. .	.35	0 0.57	23 0 18.18	— 3 24 18.07	. .	. .
0 0.42	+ 1 10.60	49 35 59.77	. .						
0 0.44	1 12.53	59.34	. .						
0 0.42	1 9.78	58.70	. .	.39	7 9.43	1 4 3.76	+ 88 29 40.05	59.87	53.88
0 0.38	1 2.67	58.25	. .						
0 0.32	+ 0 51.40	58.40	. .						
0 0.17	— 0 17.97	343 50 17.08	. .	.40	0 0.78	1 58 31.56	+ 22 43 57.69	12.25	63.54
+ 0 0.27	0 13.74	332 20 1.73	. .	.40	0 0.67	2 1 42.87	+ 11 13 42.34	. .	. .
— 0 0.01	0 45.51	323 41 17.00	. .	.41	0 0.61	2 35 20.84	+ 2 34 57.61	11.21	64.85
+ 0 0.25	0 1.40	358 47 17.50	. .	.41	0 0.99	2 40 54.61	+ 37 40 58.37	12.70	53.68
— 0 0.02	— 0 44.59	324 35 10.93	. .	+ 40.42	— 0 0.61	2 54 15.35	+ 3 28 51.52	+ 11.20	+61.20

NADIR POINTS.				
A.	B.	C.	D.	Means
	Jan. 19	Day.		° ′ 179 59
60″9	63″3	66″6	62″2	63″25
60.0	62.8	66.0	62.5	62.82
60.0	62.5	66.0	62.1	62.65
60.1	62.1	66.3	62.1	62.65
60.0	61.3	65.3	62.0	62.15
60.20	62.40	66.04	62.18	62.70
	Jan. 19	4*h*.		179 59
56.3	58.0	61.8	59.0	58.78
56.0	57.0	61.5	58.5	58.25
55.5	56.8	59.2	58.2	57.42
56.3	57.0	59.6	58.0	57.72
55.6	57.0	59.9	58.6	57.78
55.94	57.16	60.40	58.46	57.90
	Jan. 22	22*h*.		179 59
60.0	60.0	60.0	60.0	60.00
58.9	60.0	60.0	60.0	59.72
61.2	61.2	61.8	61.5	61.43
60.5	60.6	61.0	61.5	60.90
60.5	60.6	61.0	61.5	60.90
60.5	60.6	61.0	61.5	60.90
60.0	61.2	62.0	61.5	61.18
60.0	61.2	62.0	61.5	61.17
60.5	61.2	62.0	61.5	61.30
61.2	61.2	61.8	61.5	61.42
60.33	60.78	61.26	61.20	60.89
	Jan. 22	1*h*.		179 59
58.6	61.8	61.3	62.1	60.95
56.5	61.8	59.6	61.2	59.78
56.4	61.8	60.4	61.2	59.95
56.4	61.8	60.5	61.2	59.98
57.8	61.6	61.8	62.0	60.80
57.5	61.8	61.2	62.0	60.62
57.5	61.8	61.2	62.0	60.62
57.5	61.8	61.2	62.0	60.62
57.5	61.8	61.2	62.0	60.62
57.6	61.8	61.3	62.0	60.68
57.33	61.70	60.97	61.77	60.44
	Jan. 23	19*h*.		179 59
57.5	58.3	59.3	57.7	58.20
57.3	57.5	59.3	58.0	58.02
58.5	59.2	60.4	58.4	59.13
58.3	58.8	61.0	58.5	59.15
57.8	58.3	60.3	58.4	58.70
57.88	58.42	60.06	58.20	58.64

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Sun .	+ 1 9.78	
Sun .	1 9.41	
Venus .	0 1.21	
Venus .	0 1.25	
Sun .	1 8.98	
Venus .	+ 0 1.27	

Jan. 19. Error of Runs, +1″020.
" 22. do. do. 1.017.
" 23. do. do. +1.071.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Jan. 23	1	α Persei, (ref.)	..	11.0	27.2	43.0	59.0	15.5	..	3 12 43.14	169 35 9.8	9.9	10.9	9.5	10.03	. .	30.410	29.6	19.9	H.
	2	γ¹ Eridani	40.0	50.5	1.8	12.2	23.3	34.0	44.4	3 50 12.31	307 10 25.4	25.5	32.2	29.4	28.12	. .	30.406	29.0	18.5	
	3	Vesta	0.3	11.5	22.5	33.5	44.5	55.1	6.2	4 1 33.37	338 16 5.3	8.7	10.9	9.5	8.60	. .	30.404	28.9	18.2	
	4	α Tauri, (ref.)	54.2	5.2	15.8	26.3	38.0	49.0	59.2	4 26 26.81	202 41 34.0	33.8	34.8	29.8	33.10	. .	30.396	28.3	17.7	
	5	α Aurigæ, (ref.)	56.8	11.5	26.3	..	..	12.3	26.2	5 4 38.62	173 3 37.8	41.0	41.3	43.8	40.98	. .	30.382	27.2	17.0	
	6	β Tauri	21.0	32.4	44.8	56.3	8.3	20.5	32.1	5 15 56.49	349 34 43.3	42.4	43.5	43.5	43.18	. .	30.380	27.0	16.0	
	7	δ Orionis	59.2	9.5	20.0	30.3	41.0	51.5	1.8	5 23 30.47	320 41 51.0	52.8	57.2	54.4	53.85	. .				
	8	ε Orionis	14.5	25.0	35.5	46.0	56.7	7.2	17.4	5 27 46.04	319 48 40.3	41.2	47.3	46.3	43.78	. .	30.380	26.8	15.8	
	9	α Columbæ	48.3	1.2	13.3	26.0	39.0	51.8	4.2	5 33 26.26	286 59 47.4	47.6	54.0	50.4	49.85	. .	30.380	26.5	15.6	
	10	α Orionis	41.2	51.4	2.0	12.3	23.2	33.8	44.0	5 46 12.56	328 29 10.2	12.0	13.1	12.0	11.82	. .	30.374	26.0	16.2	
	11								52.0		54 28 58.2	50.5	58.9	57.2	56.20	. .	30.358	25.0	15.4	
	12							42.5			65.2	57.4	65.3	63.8	62.92	. .				
	13						40.0				67.3	60.2	67.8	66.6	65.48	. .				
	14	δ Ursæ Minoris, S. P.				41.5				6 20 38.00	68.2	60.9	69.1	67.0	66.30	. .			15.5	
	15				33.0						67.3	60.6	68.8	66.0	65.60	. .				
	16			31.0							64.6	58.0	66.9	64.1	63.40	. .				
	17		26.0								62.2	54.2	63.1	60.3	59.95	. .			15.6	
	18	α Canis Majoris	11.3	22.5	33.1	44.0	55.0	6.0	16.4	6 37 44.04	304 36 51.8	60.3	67.0	64.2	62.40	. .	30.352	24.3	16.0	
	19	α² Geminorum	32.2	44.4	56.8	9.0	21.5	34.2	46.2	7 24 9.19	353 19 26.3	26.5	28.1	27.8	27.18	. .	30.340	23.4	14.5	
	20	α Canis Minoris	5.2	16.0	26.2	37.0	47.3	58.0	8.2	7 30 36.84	326 43 41.0	44.5	45.7	46.0	44.30	. .				
	†21	15 Argus	47.0	58.5	10.0	21.5	33.0	44.5	56.0	8 0 21.50	297 16 15.3	15.0	23.1	19.5	18.22	. .	30.336	23.0	15.4	
	22	ε Hydræ	28.0	38.4	49.0	59.0	10.2	21.0	31.2	8 37 59.54	328 5 30.2	33.5	36.1	33.8	33.40	. .	30.332	22.5	13.2	
	23	ι Ursæ Majoris	13.7	29.2	45.2	1.0	17.0	33.1	48.2	8 48 1.06	9 44 21.3	19.0	22.6	23.1	21.50	. .	30.330	22.3	13.6	
	24	ε Leonis	54.0	5.7	17.2	28.3	40.2	51.8	3.0	9 36 28.60	345 35 6.6	10.1	10.4	10.8	9.48	. .	30.316	22.5	11.5	
	25	α Leonis	59.3	10.8	21.3	32.1	43.0	54.0	4.5	9 59 32.14	333 49 37.5	37.4	39.8	38.0	38.18	. .	30.318	23.0	12.0	
	26	α Ursæ Majoris	26.2	49.0	11.3	34.0	57.2	20.2	42.3	10 53 34.29	23 40 23.8	17.8	21.6	21.7	21.22	. .	30.313	23.0	16.0	
	27	γ Cephei, S. P.	2.0	46.2	32.5	19.5	4.5	50.0	36.0	11 32 18.67	64 17 29.1	23.2	29.4	26.4	27.02	. .	30.306	23.0	15.0	
	28								55.0		52 34 53.2	45.3	50.4	51.0	49.98	. .	30.304	23.5	15.2	
	29							22.0			63.3	56.6	60.6	61.6	60.52	. .				
	30						4.0				71.2	64.2	69.0	69.6	68.50	. .				
	31	Polaris, S. P.				51.0				13 2 44.33	73.7	66.9	72.1	72.0	71.18	. .	30.296	23.0	14.3	
	32				21.0						73.0	65.4	70.8	71.0	70.05	. .				
	33			58.0							66.3	58.1	62.5	62.8	62.43	. .				
	34		40.0								55.2	47.4	53.2	53.5	53.32	. .	30.288	22.2	14.5	
24	35	Sun, 2d L.	57.4	8.2	19.2	34.0	41.8	53.0	4.0	20 27 30.57	..	..	..	..	. .	. .				P.
	36	Venus, 1st and S. L.	51.0	1.5	12.0	22.0	33.4	43.5	54.0	23 2 22.49	317 42 19.0	17.2	24.2	21.0	20.35	. .	30.232	32.5	35.7	
	37			35.5							49 35 62.2	57.2	58.8	61.1	59.82	. .		34.6	34.5	
	38				13.5						55.1	51.1	49.9	54.8	52.72	. .				
	39	Polaris				44.0				1 7 10.83	53.3	48.3	47.4	52.8	50.45	. .	30.230	33.8	34.9	
	40						34.5				54.5	50.2	49.2	54.6	52.12	. .				
	41							16.0			61.0	57.5	56.7	61.4	59.20	. .				
	42								41.5		72.2	68.8	68.7	73.5	70.80	. .		34.0	34.7	
	43	Jupiter, 1st, 2d, & S.L.	51.0	1.5	11.0	21.0	34.0	44.0	55.0	2 1 23.46	333 23 26.2	29.2	32.7	31.8	29.98	. .	30.220	34.2	33.0	
	44		54.0	4.5	15.0	25.2	37.0	47.0	58.2											
	45	γ Ceti	9.5	20.0	30.0	40.5	51.0	1.5	11.4	2 34 40.56	323 42 6.0	7.5	8.9	6.9	7.32	. .	30.220	34.3	31.0	
	46	α Ceti	4.1	14.5	24.8	35.4	46.0	56.4	6.7	2 53 35.41	324 35 53.2	58.2	58.5	58.4	57.08	. .	30.210	34.5	30.1	
	47	α Persei	56.5	12.0	28.2	44.0	0.5	17.0	32.3	3 12 44.36	10 24 50.2	45.5	48.8	51.2	48.92	. .	30.194	34.0	29.3	
	48	η Tauri	8.2	19.8	31.0	42.2	54.0	5.5	16.5	3 37 42.46	344 44 7.5	9.0	8.2	7.4	8.02	. .	30.182	34.0	28.5	
	49	γ¹ Eridani	39.8	50.5	1.0	12.0	23.0	33.8	44.3	3 50 12.06	307 10 26.0	25.0	32.0	29.0	28.00	. .	30.182	34.0	28.5	
	50	Vesta	7.0	18.0	29.0	39.5	51.0	2.0	12.5	4 1 39.86	338 19 51.5	53.4	54.9	55.2	53.75	. .	30.170	33.7	28.0	
	51	α Tauri	55.0	5.4	16.5	27.0	38.0	49.5	0.0	4 26 27.34	337 18 20.9	23.5	27.5	27.2	24.78	. .	30.158	33.0	27.3	
	52	β Orionis	58.5	9.0	19.0	30.0	40.8	51.2	1.5	5 6 30.00	312 44 9.2	10.0	14.5	14.2	11.98	. .	30.144	33.0	26.5	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 5h.	H. Rate. 0s.
	s.	s.	s.	s.	
Jan. 23	—0.141	—0.358	—0.448	s 40.456	l .017
24	—0.141	—0.358	—0.448	s 40.682	l .016

21. Very unsteady.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.06	— 0 11.55	169 34 58.54	57.97	+ 40.43	+ 0 0.13	3 13 23.70	+ 49 18 38.68	+ 14.64	+42.60
— 0 0.66	1 23.10	307 9 4.49	. .	.44	— 0 0.51	3 50 52.24	+ 13 57 14.23	9.75	53.64
— 0 0.31	— 0 23.57	338 15 43.00	. .	.44	0 0.71	4 2 13.10	+ 17 9 26.31	. .	. .
+ 0 0.17	+ 0 26.90	202 41 0.16	. .	.45	— 0 0.07	4 26 7.19	+ 16 11 37.06	11.78	34.69
— 0 0.23	— 0 7.69	173 3 33.04	. .	.46	+ 0 3.19	5 5 22.27	+ 45 50 4.18	14.80	15.58
+ 0 0.52	0 11.64	349 31 32.06	. .	.46	— 0 0.85	5 16 36.10	— 28 28 13.34	12.78	17.57
0 0.00	0 51.80	320 41 2.09	. .	.46	0 0.58	5 24 10.35	— 0 25 16.63	10.27	22.88
— 0 0.23	0 53.45	319 44 50.07	. .	.46	0 0.58	5 28 25.92	— 1 18 28.65	10.18	21.84
+ 0 0.06	3 24.89	286 56 25.02	. .	.47	0 0.44	5 34 6.29	— 34 9 53.70	6.79	25.92
0 0.29	— 0 38.78	328 28 33.11	. .	.47	— 0 0.63	5 46 52.40	+ 7 22 14.39	+ 10.85	14.25
0 0.14	+ 1 38.12	54 30 34.46	. .						
0 0.13	1 33.11	36.16	. .						
0 0.12	1 29.80	35.40	. .						
0 0.12	1 28.57	34.99	. .	.48	+ 0 13.43	6 21 31.91	+ 86 35 43.08	— 51.69	+ 8.85
0 0.12	1 29.40	35.12	. .						
0 0.12	1 33.60	37.12	. .						
+ 0 0.12	+ 1 36.74	36.61	. .						
— 0 0.37	— 1 31.51	304 35 30.52	. .	.48	— 0 0.50	6 38 24.02	— 16 30 48.20	+ 8.42	— 3.76
0 0.52	0 7.49	353 19 19.17	58.05	.50	0 0.90	7 24 48.79	+ 32 13 0.37	12.70	18.54
0 0.45	0 41.60	326 40 2.19	. .	.50	0 0.63	7 31 16.71	+ 5 36 43.45	10.27	22.05
— 0 0.47	2 2.43	297 14 15.32	. .	.51	0 0.47	8 1 1.54	— 23 52 3.48	7.86	26.47
+ 0 0.16	— 0 39.32	328 1 54.24	. .	.52	0 0.64	8 38 39.42	— 6 58 35.44	10.45	36.98
0 0.23	+ 0 10.91	9 41 32.94	58.11	.52	0 1.23	8 48 40.35	+ 48 38 14.08	13.64	39.76
0 0.30	— 0 16.41	345 34 53.37	. .	.54	0 0.80	9 37 8.34	+ 24 28 34.51	11.43	48.69
+ 0 0.49	— 0 31.33	333 46 7.34	. .	.54	0 0.68	10 0 12.00	+ 12 42 48.48	10.68	53.85
— 0 0.49	+ 0 27.70	23 40 48.43	. .	.56	— 0 1.80	10 54 13.05	+ 62 34 29.08	12.63	—55.28
+ 0 0.20	2 11.01	64 19 38.22	. .	.57	+ 0 3.34	11 33 2.58	+ 76 46 40.64	10.40	+58.97
0 0.41	1 42.28	52 36 32.67	. .						
0 0.35	1 30.94	31.81	. .						
0 0.30	1 24.58	33.38	. .						
0 0.28	1 13.41	34.19	. .	.59	+ 0 30.53	13 3 55.45	+ 88 29 44.54	+ 60.23	53.89
0 0.31	1 25.43	35.79	. .						
0 0.36	1 32.75	35.54	. .						
+ 0 0.42	+ 1 44.14	36.88	. .						
. . .	. . .	. . . .	59.77	.54	— 0 0.48	20 27 1.75			
— 0 0.22	— 0 22.09	317 41 58.26	. .	.55	— 0 0.57	23 3 3.76	+ 3 24 22.46		
0 0.00	+ 1 2.73	49 36 2.55	. .						
0 0.01	1 9.17	1.90	. .						
0 0.02	1 11.04	1.49	. .						
0 0.01	1 8.37	0.49	. .	.62	3 50.17	1 4 1.28	+ 88 29 40.47	+ 60.60	53.90
0 0.00	1 1.08	0.28	. .						
— 0 0.02	+ 0 49.84	0.62	. .						
+ 0 0.18	— 0 9.53	332 22 21.03	61.34	.64	0 0.67	2 2 3.43	+ 11 16 0.51		
— 0 0.04	0 44.84	323 41 22.42	. .	.64	0 0.61	2 35 20.59	+ 2 35 0.35	11.23	64.91
+ 0 0.01	— 0 43.43	324 35 13.66	. .	.65	0 0.61	2 54 15.45	+ 3 28 51.12	11.22	61.27
— 0 0.29	+ 0 11.23	10 24 59.86	. .	.65	0 1.24	3 13 23.77	+ 49 18 37.77	14.66	42.59
+ 0 0.31	— 0 16.66	344 43 51.67	. .	.66	0 0.78	3 38 22.34	+ 23 37 29.58	12.40	45.11
— 0 0.54	1 20.61	307 9 6.85	. .	.66	0 0.51	3 50 52.21	— 13 57 15.24	9.76	53.72
+ 0 0.02	0 22.75	338 19 31.02	. .	.67	0 0.71	4 2 19.82	+ 17 13 8.93		
— 0 0.15	0 25.67	337 17 59.26	. .	.67	0 0.71	4 27 7.30	+ 16 11 37.17	11.79	34.72
+ 0 0.29	— 1 6.41	312 43 5.86	. .	.68	— 0 0.54	5 7 10.14	— 8 23 16.23	+ 9.67	+30.29

NADIR POINTS. A.	B.	C.	D.	Means
	Jan. 23	2¼h.		° ′
				179 59
57″0	56″4	59″8	57″3	57″62
57.1	57.2	60.0	57.8	58.03
57.0	57.3	59.8	58.2	58.08
57.0	57.5	60.0	57.5	58.00
57.0	57.5	59.8	58.2	58.12
57.02	57.18	59.88	57.80	57.97
	Jan. 23	12h.		179 59
57.0	57.5	59.5	58.5	58.11
57.3	57.5	60.3	58.0	58.28
57.5	57.7	59.5	58.0	58.18
57.4	57.1	59.5	58.0	58.00
57.2	57.0	59.6	58.0	57.95
57.28	57.36	57.68	58.10	58.11
	Jan. 24	Day.		179 59
56.2	59.5	60.0	58.0	58.58
58.0	59.7	60.6	60.2	59.62
58.1	59.7	61.5	61.6	60.22
58.2	60.2	60.7	60.2	59.82
58.2	60.2	60.7	60.2	59.83
58.2	59.8	61.2	59.5	59.68
58.5	59.8	61.2	59.5	59.75
58.5	59.8	61.2	59.5	59.75
60.5	59.8	61.4	61.2	60.72
58.27	59.83	61.01	59.99	59.77
	Jan. 24	Night.		179 59
58.8	62.0	61.8	62.5	61.28
58.8	63.0	63.0	62.5	61.82
58.8	63.0	63.0	62.5	61.82
58.8	63.0	63.0	62.5	61.83
58.2	61.9	60.6	62.2	60.72
57.5	61.9	60.6	62.2	60.55
58.48	62.47	62.00	62.40	61.34

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Sun . .	— 1 8.88	
Venus .	+ 0 1.29	

Jan. 23. Error of Runs + 1″071.
" 24. do. do. + 1.098.

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THERS.		Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.	Ex.	
			s.	s.	s.	s.	s.	s.	s.	H. M. s.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Jan. 24	1	β Tauri	20.6	32.5	44.2	56.0	8.4	20.5	31.5	5 15 56.24	349 34 43.2	48.3	45.2	47.0	45.92	. .	30.144	33.0	25.5	P.
	2	δ Orionis	59.2	9.5	20.0	30.0	40.5	51.2	1.5	5 23 30.27	320 41 52.0	56.2	55.5	57.2	55.25	. .	30.120	32.5	25.0	
	3	α Orionis	40.7	51.0	1.5	11.7	23.0	33.6	43.5	5 46 12.19	328 29 10.8	14.2	14.6	12.6	13.05	. .	30.120	32.5	25.0	
26	4	Polaris	51.0							1 0 26.33	49 34 79.6	66.8	74.2	73.8	73.60	. .	29.626	46.0	48.5	H
	5			26.0							68.0	54.5	62.4	62.1	61.75	. .				
	6				9.0						61.5	48.9	56.3	55.8	55.62	. .	29.630	47.0	49.7	
	7					37.0					59.2	45.9	53.8	54.3	53.30	. .				
	8						27.0				61.8	48.4	55.6	56.4	55.50	. .				
	9							8.0			68.0	54.9	62.3	62.2	61.85	. .	29.628	47.5	46.0	
	10	Mars, 1st and S. L. .	49.0	59.2	10.0	20.2	31.0	42.0	53.3	1 22 20.67	330 21 32.4	34.4	36.5	35.3	34.65	. .	29.628	47.5	46.0	
	11	α Arietis, (ref.) . . .	15.5	27.0	38.5	..	1.2	13.1	24.0	1 57 49.88	196 9 21.5	22.7	23.2	18.2	21.40	. .			45.6	
	12	Jupiter, 1st, 2d, & S.L.	35.0	..	56.2	..	17.8	..	38.5	2 2 8.39	332 27 6.8	9.6	9.0	9.3	8.18	. .	29.626	47.0	44.6	
	13		..	48.5	..	9.7	..	31.5	..											
	14	γ Ceti	8.2	19.0	29.5	39.7	50.4	1.0	11.1	2 34 39.84	323 41 59.5	63.1	64.0	62.2	62.20	. .	29.636	46.5	43.6	
	†15	Persei, 888	34.5	47.2	0.8	14.0	27.0	40.3	53.5	2 44 13.90	358 47 20.5	19.5	20.0	18.7	19.68	. .				
	16	α Ceti	3.5	13.5	24.0	34.3	45.1	55.3	5.4	2 53 34.44	324 35 49.8	53.8	55.7	54.6	53.48	. .	29.638	46.0	42.8	
	17	α Persei	55.0	11.2	27.2	43.0	59.5	15.3	31.1	3 12 43.19	10 24 49.4	43.8	48.0	49.8	47.75	. .	29.648	46.0	40.5	
	18	η Tauri, (ref.) . . .	6.3	18.0	29.0	40.3	..	..	14.5	3 37 33.62	195 15 53.2	53.7	57.0	53.7	54.40	. .	29.646	45.2	40.0	
	†19	$γ^1$ Eridani	..	49.3	0.3	..	..	33.1	43.1	3 50 16.45	307 10 21.0	20.0	27.5	25.3	23.45	. .	29.646	45.0	41.2	
27	20	Mercury	22.3	34.2	45.3	56.7	8.5	20.0	31.0	19 9 56.86	298 26 26.5	28.1	33.1	29.5	29.30	. .	30.020	41.0	43.0	
28	21	Sun, 1st and N. L. .	15.0	26.0	36.4	48.0	59.1	10.1	21.0	20 41 47.94	303 14 36.8	38.0	41.6	39.8	39.05	. .	30.112	43.0	45.0	
	22	Venus, 1st and S. L. .	49.2	59.8	10.0	20.3	31.2	41.5	1.5	23 7 20.50	319 8 36.1	39.0	42.7	39.2	39.25	. .	30.008	45.2	46.7	
	23	Polaris		8.5						1 6 44.58	49 34 66.9	54.4	62.9	61.2	61.35	. .	30.030	46.5	46.8	
	24				46.0						59.2	47.2	55.5	54.5	54.10	. .				
	25					18.5					57.8	44.3	53.8	53.4	52.32	. .	30.032	46.5	46.0	
	26						8.0				59.8	47.0	56.2	56.2	54.80	. .				
	27							50.5			67.0	54.3	63.1	63.0	61.85	. .				
	28								16.0		73.9	66.2	74.4	74.2	72.18	. .	30.034	47.0	45.9	
	29	Mars, 1st and S. L. .	35.3	46.0	56.4	7.0	18.1	28.2	38.8	1 27 7.11	330 51 51.8	54.0	58.5	54.5	54.70	. .			45.7	
	30	α Arietis	15.0	26.4	37.8	49.0	0.5	11.8	23.0	1 57 49.07	343 50 34.1	35.5	38.2	37.1	36.22	. .	30.044	46.8	42.5	
	31	Jupiter, 1st, 2d, & S.L.	21.2	..	42.5	..	4.0	..	25.0	2 2 54.44	332 31 55.0	57.0	57.5	58.8	57.08	. .			43.6	
	32		..	34.4	..	55.5	..	17.2	..											
Feb. 3	33	Venus, 1st and S. L. .	16.5	27.7	38.2	48.2	59.5	10.0	20.0	23 12 48.59	321 3 34.7	38.5	41.1	40.5	38.70	. .	30.104	41.0	42.0	
	34	γ Cephei	..	45.5	31.5	16.2	3.5	50.0	33.7	23 32 40.67	37 52 20.2	16.0	17.2	19.8	18.30	. .	30.100	41.5	42.2	
	35	Polaris	22.0							1 4 23.00	49 34 77.1	66.0	72.3	72.3	71.92	. .	30.080	42.8	43.5	
	36			0.0							65.9	53.8	61.4	61.4	60.63	. .				
	†37				..						59.5	48.0	55.3	55.4	54.55	. .				
	38					10.0					58.8	46.8	54.3	54.4	53.58	. .	30.080	42.0	43.1	
	39						59.0				60.4	48.5	56.0	56.4	55.32	. .				
	40							41.0			68.3	57.1	63.3	63.3	63.00	. .				
	41								6.0		79.0	67.8	74.5	74.6	73.98	. .	30.078	43.0	43.3	
	42	γ Ceti	2.3	12.8	23.2	33.7	44.2	55.0	4.8	2 34 33.71	323 42 0.5	5.3	6.6	3.7	4.03	. .	30.078	43.7	42.5	
	43	α Ceti	57.0	7.5	17.8	28.2	38.8	49.3	59.3	2 53 28.27	343 35 53.2	56.5	58.4	57.4	56.38	. .	30.080	44.0	42.8	
	44	α Persei	48.5	4.8	20.5	35.4	53.0	9.2	24.4	3 12 36.54	10 24 50.6	46.0	50.1	51.5	49.55	. .	30.078	44.0	41.6	
	45	Moon, 1st L.	1.2	12.3	23.6	34.7	46.1	57.5	8.3	3 24 34.81	.. .. ..	..	..	..	..	. .				
	†46	η Tauri	..	..	25.0	35.5	47.0	58.3	9.5	3 37 47.06	344 44 5.2	5.5	8.3	7.8	6.70	. .	30.076	43.8	40.5	
	†47	α Canis Majoris . . .	4.1	15.0	26.1	36.4	48.0	58.8	9.5	6 37 36.84	304 36 55.4	59.0	55.3	53.2	55.72	. .	30.026	40.0	34.8	
	48	ε Canis Majoris . . .	14.0	25.7	37.8	49.4	1.8	13.4	25.2	6 51 49.61	292 22 27.0	27.5	35.0	33.0	30.63	. .	30.026	39.8	35.0	
	49	δ Geminorum, (ref.) .	37.1	48.4	0.0	10.9	22.5	33.5	44.5	7 10 10.99	196 37 56.4	55.0	55.5	53.2	55.02	. .	30.026	39.8	34.7	
	50	$α^2$ Geminorum, (ref.) .	24.8	..	49.5	1.5	14.2	27.0	39.0	7 24 6.00	186 40 30.3	31.0	33.1	30.9	31.33	. .			34.3	
	51	α Canis Minoris . . .	58.2	8.3	19.0	29.5	40.3	50.8	1.2	7 30 29.61	326 43 39.5	42.0	46.0	47.8	43.82	. .			34.0	
	52	β Geminorum	33.2	45.1	56.8	8.5	21.0	32.8	44.2	7 35 8.80	349 29 53.0	56.5	55.2	56.8	55.38	. .	30.022	39.8	34.0	

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 5h.	0s.
	s.	s.	s.	s.	
Jan. 24	—0.141	—0.358	—0.448	s 40.682	l .016
26	—0.141	0.358	0.448	41.562	.017
28	+0.258	0.246	0.041	42.199	.023
Feb. 3	+0.258	—0.246	—0.041	s 46.813	l .021

15. From wire II to wire VII, transit recorded 10s. too late.
19. Clouds.
37. Observed for declination at 57m. 10s.
46. Cloudy ; the instrument covered after this observation.
47. Commenced anew ; sky hazy.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.46	− 0 11.32	349 34 35.06	61.34	+ 40.69	− 0 0.85	5 16 36.08	+ 28 28 13.97	+ 12.79	+17.55
0 0.03	0 50.36	320 41 4.92	. .	.69	0 0.59	5 24 10.37	− 0 25 17.17	10.28	22.98
0 0.28	− 0 37.74	328 28 35.59	. .	.69	− 0 0.63	5 46 52.25	+ 7 22 13.50	10.85	14.32
0 0.16	+ 0 47.19	49 36 0.95	. .						
0 0.20	0 58.32	0.27	. .						
0 0.22	1 5.18	1.02	59.08	41.49	+ 2 47.74	1 3 55.56	+ 88 29 41.15	62.21	53.96
0 0.23	1 7.52	1.05	. .						
0 0.22	1 5.68	1.40	. .						
+ 0 0.20	+ 0 59.16	1.21	. .						
− 0 0.12	− 0 26.82	330 21 7.71	. .	.50	− 0 0.65	1 23 1.73	+ 9 14 47.88	. .	. .
0 0.07	+ 0 16.81	196 9 38.14	. .	.51	+ 0 0.09	1 58 31.48	+ 22 44 0.19	12.29	63.75
− 0 0.03	− 0 9.03	332 26 59.96	. .	.51	− 0 0.67	2 2 49.23	+ 11 20 39.29	. .	. .
0 0.00	0 42.79	323 41 19.41	. .	.52	0 0.61	2 35 20.75	+ 2 34 59.58	11.26	65.04
+ 0 0.14	0 1.19	358 47 18.63	. .	.52	0 0.99	2 44 54.82	+ 37 41 58.80	13.31	62.61
+ 0 0.03	− 0 41.45	324 35 12.06	. .	.53	0 0.61	2 54 15.36	+ 3 28 52.23	11.25	61.40
− 0 0.16	+ 0 10.78	10 24 58.41	. .	.53	− 0 1.24	3 13 23.48	+ 49 19 38.58	14.71	42.59
0 0.18	+ 0 16.03	195 16 10.25	. .	.53	+ 0 7.05	3 38 22.20	+ 23 37 28.08	12.43	45.16
− 0 0.28	− 1 17.10	307 9 6.07	. .	.54	− 0 5.90	3 50 52.09	− 13 57 13.76	9.79	53.94
+ 0 0.06	1 42.34	298 24 47.02	. .	.97	0 0.31	19 9 39.14	− 22 41 32.81	. .	. .
0 0.04	17 37.95	302 57 1.10	59.08	.99	− 0 0.29	20 43 38.65	− 18 9 18.73	. .	. .
0 0.06	− 0 16.09	319 8 23.22	. .	42.06	+ 0 0.22	23 8 4.15	− 1 57 56.61	. .	. .
0 0.19	+ 0 59.96	49 36 1.31	. .						
0 0.22	1 6.64	0.74	. .						
0 0.22	1 8.93	1.26	. .	.10	− 3 29.96	1 3 56.72	+ 88 29 42.16	63.97	54.09
0 0.21	1 6.58	1.38	. .						
0 0.18	1 0.99	2.84	. .						
+ 0 0.15	+ 0 48.71	0.88	. .						
− 0 0.17	− 0 26.75	330 51 27.78	. .	.12	+ 0 0.17	1 27 49.59	+ 9 45 7.95	. .	. .
+ 0 0.07	0 17.16	343 50 19.06	. .	.15	0 0.11	1 58 31.33	+ 22 43 59.23	12.32	63.91
+ 0 0.20	0 9.93	332 31 47.35	. .	.15	0 0.16	2 3 36.75	+ 11 25 27.52	. .	. .
− 0 0.11	0 10.59	321 3 28.01	60.40	46.69	+ 0 0.22	23 13 37.00	− 0 2 53.11	. .	. .
+ 0 0.08	− 0 46.16	37 53 4.54	. .	.69	− 0 23.83	23 33 3.53	+ 76 46 43.19	11.05	61.22
0 0.15	+ 0 49.56	49 36 1.63	. .						
0 0.19	1 0.67	1.49	. .						
0 0.22	1 7.64	2.41	. .						
0 0.22	1 9.46	3.26	. .	.73	− 1 18.14	1 3 51.59	+ 88 29 41.40	68.49	54.91
0 0.21	1 7.08	2.61	. .						
0 0.19	1 0.04	3.23	. .						
+ 0 0.15	+ 0 49.11	3.24	. .						
− 0 0.01	− 0 43.54	323 41 20.49	. .	.76	+ 0 0.21	2 35 20.68	+ 2 34 59.38	11.38	65.52
+ 0 0.01	− 0 42.11	324 35 14.28	. .	.76	+ 0 0.20	2 54 15.23	+ 3 28 53.13	11.36	61.89
− 0 0.12	+ 0 10.92	10 25 0.35	. .	.77	− 0 0.09	3 13 23.22	+ 49 18 39.20	14.90	42.58
. . .	. . .	. . . . .	. .	.78	+ 0 0.14	3 26 27.78			
+ 0 0.14	− 0 16.25	344 43 50.59	. .	.78	− 0 11.31	3 38 22.53	+ 23 37 29.44	12.55	+45.41
− 0 0.15	1 26.97	304 35 28.60	60.50	.84	+ 0 0.29	6 38 23.97	− 16 30 52.65	8.48	− 1.71
− 0 0.27	2 24.99	292 20 5.37	. .	.84	0 0.35	6 52 36.80	− 28 46 15.88	7.26	0.27
+ 0 0.18	0 17.97	196 38 13.17	. .	.85	+ 0 0.02	7 10 57.86	+ 22 15 26.58	11.90	13.60
− 0 0.25	0 7.11	186 40 38.19	60.60	.86	− 0 4.16	7 24 48.70	+ 32 13 1.66	12.69	19.32
+ 0 0.25	0 39.55	326 43 4.52	. .	.86	+ 0 0.19	7 31 16.66	+ 5 36 43.17	10.25	21.07
− 0 0.01	− 0 11.18	349 29 44.19	. .	.87	+ 0 0.08	7 35 55.75	+ 28 23 22.84	+ 12.13	−21.62

NADIR POINTS.				
A.	B.	C.	D.	Means
	Jan. 26			° ′
				179 59
58″6	59″2	60″5	58″4	59″18
58.6	58.8	60.7	58.5	59.15
59.2	58.9	60.3	58.7	59.27
58.5	58.5	60.3	58.4	58.92
58.3	58.1	60.5	58.5	58.85
58.94	58.70	60.46	58.50	59.08
	Jan. 28			179 59
58.0	58.3	61.1	59.1	59.12
58.3	58.5	60.2	58.5	58.88
58.0	58.3	61.2	59.5	59.25
58.2	57.8	60.6	59.3	58.98
58.3	58.1	60.8	59.5	59.17
58.16	58.20	60.78	59.18	59.08
	Feb. 3,	0*h*.		179 59
58.3	58.5	62.3	59.8	59.72
59.0	60.0	62.8	60.9	60.68
58.9	59.0	63.0	59.6	60.12
59.0	60.3	63.3	60.6	60.80
59.0	60.5	63.2	60.6	60.83
58.7	59.2	62.8	60.3	60.25
58.82	59.58	62.90	60.30	60.40
	Feb. 3,	9*h*.		179 59
59.8	59.8	61.7	59.5	60.20
60.4	60.2	62.2	60.2	60.75
59.8	60.0	62.0	60.4	60.55
60.5	60.0	62.2	60.8	60.88
60.0	60.1	62.0	60.4	60.62
60.10	60.02	62.02	60.26	60.60

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Mars .	+ 0 0.21	
Sun . .	+ 1 8.43	
Venus .	+ 0 1.37	
Mars .	+ 0 0.19	
Venus .	+ 0 1.50	
Moon .	+ 1 6.05	

Jan. 24. Error of Runs, +1.10.
" 26. do. do. 0.61.
" 27. do. do. 0.32.
" 28. do. do. 0.59.
Feb. 3. do. do. +0.11.

Jan. 27. Adjusted for level, and made the collimation of wire IV. equal to the level error.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THERS.		Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.	Ex.	
			s.	s.	s.	s.	s.	s.	s.	h. m. s.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Feb. 5	1	α Persei, (ref.)	48.0	4.0	19.8	..	52.2	8.3	24.0	3 12 36.05	169 35 11.0	10.4	9.5	12.2	10.78	. .	29.996	50.2	48.6	
	2	η Tauri	0.2	11.5	22.8	34.2	46.0	57.3	8.3	3 37 34.33	344 44 5.5	6.7	6.6	7.7	6.62	. .	30.016	50.0	48.0	
	3	ε Ursæ Minoris, S. P.	6.5	22.0	40.5	0.0	17.0	34.3	52.2	5 0 58.93	58 48 10.0	1.2	6.1	7.0	6.08	. .	30.060	49.5	46.1	
	4	β Orionis	50.4	1.2	11.5	22.0	33.0	43.3	54.0	5 6 22.20	312 44 5.0	7.8	10.0	9.1	7.98	. .				
	†5	Moon, 1st and S. L.	30.0	41.6	53.0	4.0	15.8	27.0	38.1	5 11 4.21	340 31 11.3	14.4	14.9	15.2	13.95	. .	30.060	49.3	44.5	
	6	α Leporis	37.3	48.2	59.4	10.0	21.2	32.3	43.2	5 25 10.23	303 11 17.8	20.2	22.4	22.7	20.78	. .	30.064	49.0	44.0	
	7	Bessel's Zone, 511	46.7	1.3	15.5	29.8	45.5	59.1	13.2	6 37 30.01	5 1 38.4	36.1	38.2	40.1	38.20	. .	30.090	47.0	42.1	
9	8	α Cassiopeiæ	4.8	23.2	42.3	0.0	19.0	37.5	55.4	0 31 0.31	16 47 51.8	44.2	53.3	54.2	50.88	. .	30.023	36.2	33.0	
	9		15.0								49 34 68.2	59.4	68.8	68.7	66.28	. .	30.026	36.2	33.0	
	†10			52.0							58.8	49.7	59.8	59.0	56.83	. .				
	11				42.0						51.5	42.8	53.5	53.0	50.20	. .				
	12	Polaris				2.0				1 3 11.71	48.0	39.8	49.8	49.5	46.78	. .	30.030	36.2	33.2	
	13						50.0				53.3	45.0	54.0	53.6	51.48	. .				
	14							31.0			59.5	51.5	59.6	60.4	57.75	. .				
	15								10.0		69.5	62.9	72.0	71.1	68.88	. .	30.034	36.2	32.7	
	16	α Persei	..	3.5	19.6	35.0	51.2	7.8	23.1	3 12 43.37	10 24 45.7	43.8	50.7	50.5	47.68	. .	30.058	35.0	29.0	
	17	η Tauri	59.4	10.8	22.7	33.3	45.0	56.5	7.8	3 37 33.64	344 44 4.4	7.4	9.5	9.0	7.58	. .	30.068	34.7	28.6	
	†18	α Tauri	46.2	57.0	8.0	18.6	30.0	41.0	51.3	4 26 18.87	337 18 20.8	24.3	27.2	28.1	25.10	. .	30.072	34.0	27.5	
	19	α Aurigæ	48.5	4.0	29.0	34.2	49.6	4.0	18.2	5 4 33.93	6 56 17.8	16.5	25.4	24.0	20.92	. .	30.082	33.0	26.5	
	20	β Tauri	11.5	23.5	36.2	47.8	59.5	11.6	23.0	5 15 47.59	349 34 39.0	41.6	49.0	48.9	44.63	. .	30.086	33.0	26.4	
	21	δ Orionis	50.4	0.8	12.0	22.0	32.3	43.0	53.0	5 23 21.93	320 41 45.6	49.1	55.3	55.5	51.38	. .				
	22	ε Orionis	6.0	16.2	27.0	37.4	48.0	58.5	9.0	5 27 37.44	319 48 38.2	38.5	46.6	44.5	41.92	. .	30.090	32.6	26.0	
	23	α Columbæ	39.4	52.2	5.3	17.2	30.2	43.0	55.2	5 33 17.50	286 59 40.2	42.1	49.5	49.2	45.25	. .	30.092	32.2	26.0	
	24	α Orionis	32.0	42.2	53.4	3.3	14.4	25.0	35.2	5 46 3.64	328 29 8.5	11.6	17.0	14.9	13.00	. .	30.100	32.5	25.8	
	†25	Mercury centre	58.7	10.2	21.5	32.3	44.0	55.2	6.2	20 29 32.59	300 30 2.0	2.4	10.5	7.0	5.48	. .	30.248	34.1	33.6	
10	26	Sun, 1st and N. L.	40.2	51.2	2.0	12.5	23.8	34.8	45.2	21 34 12.81	307 5 55.6	58.5	65.0	63.0	60.68	. .	30.214	35.0	36.0	
	27	Venus, 1st and S. L.	35.8	46.2	57.0	6.8	17.6	28.2	38.2	23 13 7.11	322 42 53.5	54.9	60.0	59.7	57.02	. .	30.154	37.0	38.3	
	28	γ Cephei	57.5	43.3	30.3	14.0	1.0	46.5	31.5	23 32 14.87	37 52 19.0	11.6	17.6	18.3	16.62	. .	30.144	37.8	38.7	
	29	α Cassiopeiæ	4.5	23.0	42.2	0.0	19.0	37.8	55.6	0 31 0.30	16 47 52.2	44.2	50.0	51.4	49.45	. .	30.108	39.0	39.0	
	30		12.0								49 35 12.0	13.3	8.8	12.0	11.52	. .	30.106	39.0	39.0	
	31			49.0							34 60.5	51.8	57.5	61.4	57.80	. .				
	32				41.6						54.0	44.1	51.2	54.8	51.02	. .				
	33	Polaris				1.0				1 3 9.00	52.0	42.9	49.0	53.1	49.25	. .	30.100	39.3	39.0	
	34						49.0				54.1	44.2	50.8	55.3	51.10	. .				
	35							33.0			61.8	52.6	58.2	62.7	58.82	. .				
	36								58.0		35 13.1	14.3	10.6	14.0	13.00	. .	30.094	39.5	39.0	
	†37	Moon, 1st and S. L.	8.3	19.0	29.8	40.5	51.8	2.5	13.0	9 22 40.70	330 28 38.3	39.1	44.3	45.4	41.78	. .	29.964	37.7	33.5	
	38	ε Leonis	45.2	56.5	8.6	19.3	31.4	43.0	54.0	9 36 19.71	345 35 6.9	5.8	10.4	9.5	8.15	. .	29.954	37.5	33.5	
	39	α Leonis	51.4	2.0	13.2	23.3	34.2	45.2	55.2	9 59 23.50	333 49 32.7	35.4	38.4	40.5	36.75	. .	29.940	37.2	33.5	
11	40								59.0		54 29 16.4	7.6	16.0	15.4	13.85	. .			39.2	
	41							49.0			20.0	13.7	20.5	20.3	18.62	. .				
	42						47.0				22.8	15.0	23.5	23.4	21.18	. .				
	43	δ Ursæ Minoris, S. P.				47.0				6 20 44.14	24.6	16.0	24.7	24.2	22.38	. .	29.738	41.8	38.8	
	44				36.0						23.0	14.6	23.0	22.6	20.80	. .				
	45			37.0							20.3	12.1	20.6	19.8	18.20	. .				
	46		34.0								14.1	5.5	14.1	13.3	11.75	. .			38.5	
	47	Bessel's Zone, 511	45.2	59.5	14.6	28.6	43.5	58.0	12.1	6 37 28.79	5 1 40.3	34.4	40.1	42.8	39.45	. .	29.740	41.9	40.0	
	48	Bessel's Zone, 511	11.7	26.0	41.0	54.7	9.0	23.4	37.2	6 55 54.71	4 4 27.5	23.2	27.4	28.3	26.60	. .	29.742	42.0	40.0	
	†49	Anonymous	45.0	58.5	13.0	26.0	40.5	54.0	8.5	7 5 26.50	2 57 60.2	56.5	59.0	62.6	59.58	. .			40.2	
	†50	Anonymous	59.5	13.1	37.2	50.1	5.0	19.0	32.2	7 19 50.87	1 46 34.0	32.5	34.5	36.0	34.25	. .				
	†51	α² Geminorum	22.8	35.0	47.5	59.2	12.0	24.8	37.0	7 23 59.76	353 19 29.2	30.5	32.5	32.3	31.12	. .			40.3	
	52	α Canis Minoris	56.2	6.4	17.2	27.3	38.1	58.8	9.0	7 30 27.57	326 43 38.0	39.0	43.1	45.0	41.27	. .	29.785	42.0		

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 9h.	0s.
	s.	s.	s.	s.	
Feb. 5	+0.258	—0.246	—0.041	s 47.715	l .011
9	.124	.166	.117	48.506	.013
10	.124	.166	.117	48.910	.011
11	+0.124	—0.166	—0.117	s 49.011	l .010

5. Observed S. L. at 12*m*. 9*s*.
10 to 18. Very unsteady.
25. Planet tremulous; but observation good.
37. Observed S. L. at 23*m*. 42*s*.
49. Very faint.
50. Observed the northern of two.
51. Beautifully defined.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.21	— 0 10.74	169 35 0.29	60.09	+ 47.64	— 0 0.23	3 13 23.46	+ 49 18 39.09	+ 14.96	+42.61
+ 0 0.26	— 0 15.98	344 43 50.90	. .	.64	+ 0 0.10	3 38 22.07	+ 23 37 30.06	12.58	+45.48
— 0 0.03	+ 1 36.83	58 49 42.88	. .	.67	0 2.38	5 1 49.00	+ 82 16 37.96	— 17.97	— 7.68
+ 0 0.25	— 1 3.73	312 43 4.50	. .	.67	0 0.25	5 7 10.12	— 8 23 16.34	9.80	+31.61
— 0 0.35	+32 31.81	341 3 44.50	. .	.67	0 0.13	5 12 57.56	+ 19 57 25.47		
+ 0 0.19	— 1 30.07	303 9 50.90	. .	.67	+ 0 0.29	5 25 58.19	— 17 56 30.04	— 8.85	+28.09
— 0 0.46	+ 0 5.22	5 1 42.96	. .	.69	— 0 0.03	6 38 17.67	+ 43 55 22.12	+ 14.41	— 8.83
+ 0 0.02	0 18.22	16 48 9.12	61.18	+ 48.40	0 0.32	0 31 48.39	+ 55 41 47.19	13.01	+64.36
+ 0 0.08	0 50.77	49 35 57.13	. .						
0 0.11	1 1.96	58.90	. .						
0 0.12	1 8.79	59.11	. .						
0 0.13	1 10.82	57.73	. .	.41	0 10.65	1 3 49.47	+ 88 29 36.84	72.63	55.66
0 0.12	1 8.46	60.06	. .						
0 0.11	1 1.43	59.29	. .						
+ 0 0.08	0 50.22	59.18	. .						
— 0 0.30	+ 0 11.20	10 24 58.58	. .	.43	0 8.26	3 13 23.54	+ 49 18 36.67	15.06	42.75
+ 0 0.32	— 0 16.65	344 43 51.25	62.13	.43	0 0.08	3 38 21.99	+ 23 37 27.76	12.65	45.64
— 0 0.16	— 0 25.57	337 17 59.37	. .	.45	0 0.05	4 21 7.27	+ 16 11 35.88	12.01	35.27
+ 0 0.24	+ 0 7.46	6 56 28.62	. .	.45	0 0.22	5 5 22.16	+ 45 50 5.74	15.09	14.26
— 0 0.66	— 0 11.28	349 34 32.69	. .	.45	— 0 0.10	5 16 35.94	+ 28 28 9.81	12.98	17.24
+ 0 0.05	0 50.21	320 41 1.23	. .	.46	+ 0 0.01	5 24 10.40	— 0 25 20.70	10.46	24.41
— 0 0.26	0 51.85	319 47 49.81	. .	.46	0 0.01	5 28 25.91	— 1 18 32.12	10.35	23.42
+ 0 0.10	3 18.56	286 56 26.79	. .	.46	+ 0 0.09	5 34 6.05	— 34 9 55.09	7.06	29.15
+ 0 0.30	0 37.65	328 28 35.65	. .	.46	— 0 0.02	5 46 52.08	+ 7 22 13.25	10.98	15.27
0 0.00	1 37.22	300 28 28.26	. .	.77	+ 0 0.08	20 30 21.44	— 30 37 54.23	. .	. .
+ 0 0.02	17 26.12	306 48 34.58	62.74	.78	+ 0 0.04	20 36 8.59	— 14 17 48.91	. .	. .
— 0 0.02	— 0 4.62	332 42 52.38	. .	.80	0 0.00	23 13 57.60	+ 1 36 28.89	. .	. .
— 0 0.02	+ 0 46.56	37 53 3.16	60.69	.80	— 0 1.09	23 33 2.58	+ 76 46 39.71	11.44	63.08
0 0.00	0 18.05	16 48 7.50	. .	.82	0 0.33	0 31 48.79	+ 55 41 44.01	13.03	64.56
+ 0 0.23	0 49.96	49 35 61.71	. .						
0 0.28	1 1.20	59.28	. .						
0 0.31	1 8.13	59.46	. .						
0 0.32	1 10.15	59.72	. .	.82	0 10.65	1 3 47.17	+ 88 29 38.84	73.41	+55.81
0 0.31	1 7.78	59.19	. .						
0 0.27	1 0.67	59.76	. .						
+ 0 0.22	0 49.59	62.81	. .						
— 0 0.48	+40 48.65	331 9 29.95	. .	.91	0 0.03	9 24 31.53	+ 10 3 8.51	. .	. .
+ 0 0.24	— 0 15.20	345 34 53.19	. .	.92	0 0.08	9 37 8.55	+ 24 28 31.75	11.20	—48.88
— 0 0.45	— 0 29.55	333 49 6.75	. .	.92	— 0 0.04	10 0 12.38	+ 12 42 45.31	+ 10.42	—52.66
+ 0 0.22	+ 1 31.60	54 30 45.67	. .						
0 0.20	1 26.55	45.37	. .						
0 0.19	1 23.49	44.86	. .						
0 0.18	1 22.60	45.16	60.61	.98	+ 0 4.88	18 21 38.00	+ 86 35 36.43	— 55.66	+14.16
0 0.19	1 23.69	44.68	. .						
0 0.20	1 26.74	45.14	. .						
+ 0 0.23	1 31.65	43.63	. .						
— 0 0.46	0 5.18	5 1 44.17	. .	.98	— 0 0.20	6 38 17.57	+ 43 55 22.81	+ 14.48	— 9.51
0 0.41	0 4.19	4 4 30.38	. .	.99	0 0.19	6 56 43.51	+ 42 58 9.02	14.22	14.37
0 0.28	0 3.03	2 58 2.33	. .	.99	0 0.18	7 6 15.31	+ 41 51 40.97	13.99	16.66
0 0.43	+ 0 1.80	1 46 35.62	. .	.99	0 0.17	7 20 39.69	+ 40 40 14.26	13.74	20.23
0 0.42	— 0 6.87	353 19 23.83	. .	.99	0 0.12	7 24 48.63	+ 32 13 3.47	12.72	19.89
— 0 0.46	— 0 38.57	326 43 2.24	. .	.99	— 0 0.01	7 31 16.55	+ 5 36 41.88	+ 10.28	—20.47

NADIR POINTS.				
A.	B.	C.	D.	Means
	Feb. 9,	0h.		° ′ 179 59
59″0	60″5	62″8	61″5	60″95
57.8	60.5	64.0	62.0	61.08
58.0	60.6	64.2	62.7	61.37
57.4	60.0	64.1	62.7	61.05
57.8	60.4	64.3	62.7	61.30
58.00	60.50	63.88	62.36	61.18
	Feb. 9,	Night.		179 59
57.4	60.5	66.0	63.8	61.92
57.0	61.1	66.1	64.3	62.13
57.5	60.5	66.0	63.5	61.88
58.0	60.8	66.6	63.5	62.22
58.0	61.3	66.7	64.0	62.50
57.58	60.84	66.28	63.82	62.13
	Feb.10	Day.		179 59
58.2	61.5	66.4	63.6	62.42
58.6	61.5	66.2	64.3	62.65
58.6	61.5	66.6	64.4	62.78
58.8	62.0	66.4	64.2	62.85
58.7	61.4	67.1	64.8	63.00
58.58	61.58	66.54	64.26	62.74
	Feb.10	0h.		179 59
60.3	60.0	61.2	61.5	60.75
60.3	59.5	61.5	61.5	60.70
60.5	59.2	61.0	61.7	60.60
60.0	59.3	61.8	61.8	60.72
60.3	59.4	61.3	61.7	60.68
60.28	59.48	61.36	61.64	60.69

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Moon .	+ 1 5.55	
Sun . .	1 6.96	
Venus .	0 1.69	
Moon .	+ 1 1.95	

Feb. 9. Error of Runs, +1″13.
" 10, at 23*h*. do. do. 0.06.
" 10, at 9*h*. do. do. 0.84.
" 11. do. do. +0.84.
" 9. Nadir point advanced one division on the circle before reading the microscopes.
" 10. Nadir point advanced one division.

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Feb. 11	1	β Geminorum . . .	..	43.0	55.0	6.5	18.2	31.0	42.2	7 35 12.65	349 29 54.5	53.4	56.2	56.8	55.22	. .			40.2	H.
	2	Anonymous . . .	48.0	1.5	15.0	28.0	41.8	54.5	8.0	7 41 28.11	359 25 53.1	49.5	52.3	56.1	52.75	. .				
	†3	15 Argus	38.0	49.5	1.3	12.0	24.0	35.6	46.4	8 0 12.40	297 16 3.2	3.2	11.0	9.8	6.80	. .	29.766	42.0	40.2	
	4	Bessel's Zone, 401 .	5.2	17.5	30.1	41.5	54.4	6.0	18.3	8 23 41.86	352 30 22.7	21.4	24.0	24.9	23.25	. .	29.776	42.0	39.7	
	5	ε Hydræ	18.8	29.2	40.1	50.3	1.2	11.4	22.0	8 37 50.43	328 5 25.0	28.0	31.3	30.6	28.72	. .	29.784	42.0	39.2	
	6	Bessel's Zone, 344–345	24.2	36.0	47.5	58.5	10.4	22.1	33.0	8 48 58.81	345 39 47.0	47.3	49.6	50.8	48.68	. .	29.788	42.0	39.2	
	7	α Hydræ	42.8	53.3	4.2	14.4	25.2	35.5	46.2	9 19 14.51	313 7 25.4	24.8	33.0	32.3	28.88	. .	29.788	42.0	38.8	
	8	ε Leonis	45.1	56.3	8.5	19.3	31.2	43.0	54.0	9 36 19.63	345 35 9.2	7.4	11.7	11.3	9.90	. .	29.796	42.0	39.2	
	9	α Leonis	51.0	2.0	12.8	23.2	34.1	45.0	55.2	9 59 23.33	333 49 33.0	35.5	39.5	40.8	37.20	. .	29.792	41.8	38.5	
	†10	Moon, S. L. . . .	..	..	..	..	..	..	..	. . . .	326 34 44.9	45.0	51.8	53.4	48.78	. .	29.796	41.7	38.2	
	11	α Ursæ Majoris . . .	..	..	3.0	24.2	48.0	11.0	32.8	10 53 47.80	23 40 28.8	21.4	27.9	30.2	27.08	. .	29.822	41.3	37.0	
	12	δ Hydræ et Crateris . .	19.8	30.6	41.8	52.0	3.0	14.0	24.4	11 10 52.23	307 10 35.5	39.2	46.0	47.6	42.08	. .	29.840	41.0	37.2	
	13	γ Cephei, S. P. . . .	55.5	39.4	26.0	13.0	56.5	43.5	29.2	11 33 13.30	64 17 41.0	31.3	40.4	40.3	38.30	. .	29.826	40.8	37.4	
	14	γ Ursæ Majoris . . .	1.5	19.2	38.1	55.2	14.0	32.0	49.5	11 44 55.64	15 38 47.5	42.7	48.3	50.5	47.25	. .	29.834	40.8	37.2	
	15	β Corvi	58.0	9.0	20.8	31.6	43.3	54.7	5.8	12 25 31.89	298 35 19.3	22.0	26.8	28.0	24.02	. .	29.854	40.4	36.9	
	16	α Cassiopeiæ, S. P. . .	3.5	21.4	40.2	59.0	17.0	36.0	54.5	12 30 58.90	85 14 14.0	6.2	13.5	12.5	11.55	. .	29.853	40.3	36.8	
	17	Polaris, S. P. . . .							58.0		52 35 67.3	56.8	64.6	66.0	63.68	. .	29.886	39.5	35.1	
	18							25.0			36 19.3	9.9	16.3	16.7	15.50	. .				
	19						6.0				26.8	16.0	23.4	24.5	22.68	. .				
	†20					56.0				13 0 36.83	25.3	15.7	22.3	24.2	21.88	. .	29.880	40.0	35.4	
	21				20.0						23.1	13.8	20.9	21.9	19.92	. .				
	22		56.0								35 66.9	55.5	62.6	64.5	62.38	. .	29.868	40.0	36.5	
	23	α Virginis	46.2	56.8	8.0	18.0	29.0	39.3	50.0	13 16 18.19	310 45 58.5	59.5	66.0	66.2	62.55	. .	29.878	40.0	35.0	
	†24	β Ursæ Minoris . . .	24.0	2.0	42.5	23.0	4.5	44.0	22.5	14 50 23.21	35 52 23.3	15.2	22.6	23.2	21.08	. .	29.914	37.2	32.8	
	†25	ζ Ursæ Minoris . . .	..	7.0	0.0	49.2	42.2	34.0	23.5	15 49 15.98	39 21 10.6	3.9	9.5	12.5	9.12	. .	29.956	36.5	31.4	
	26	ε Ursæ Minoris . . .	..	26.2	46.5	1.5	20.5	39.0	55.0	17 1 41.45	43 21 66.2	56.8	62.1	64.2	62.32	. .	30.016	36.0	31.7	
	†27	δ Ursæ Minoris . . .	5.0	59.0	5.0	50.0	52.0	48.0	..	18 19 26.50	. . . .	..	..	..	..	. .			33.6	
	28	α Lyræ	14.0	27.1	41.2	53.8	7.7	21.3	34.2	18 30 54.19	359 44 57.2	53.6	57.2	59.4	56.85	. .	30.070	36.0	33.6	
	29	Mercury	..	..	23.3	34.0	45.4	56.5	7.5	20 41 45.34	301 8 42.8	41.7	50.2	50.0	46.18	. .	30.124	38.0	35.7	
12	30	α Cassiopeiæ	4.0	22.2	41.2	59.0	18.0	37.0	55.0	0 30 59.49	16 47 53.0	44.5	50.0	52.2	49.92	. .	30.128	40.2	37.5	
	31	Polaris	11.0								49 35 12.2	2.0	8.0	11.7	8.48	. .	30.128	40.2	36.7	
	32			46.0							34 60.4	50.7	57.0	60.9	57.25	. .				
	33				39.0						52.9	42.6	59.7	53.5	49.68	. .				
	34					1.0				1 3 6.86	50.0	40.3	47.2	51.4	47.23	. .	30.128	39.8	36.8	
	35						49.0				52.5	42.7	50.0	53.3	49.62	. .				
	36							28.0			60.4	50.8	57.8	61.6	57.65	. .				
	37								54.0		35 12.4	3.5	10.4	12.4	9.68	. .	30.124	39.0	37.2	
	38	β Ursæ Minoris, S. P. .	23.1	2.0	42.0	23.0	0.8	42.0	21.0	2 50 23.41	66 17 24.6	16.0	23.2	24.1	21.98	. .	30.152	38.0	35.2	
	39	α Persei	46.2	2.0	18.2	34.0	50.4	6.4	22.1	3 12 34.19	10 24 50.0	43.2	51.0	52.2	49.10	. .	30.154	37.8	34.3	
	40	η Tauri	58.4	10.0	22.3	32.2	44.2	55.8	6.8	3 37 32.81	344 44 6.3	4.8	10.2	8.4	7.42	. .	30.160	37.0	33.5	
	41	ζ Ursæ Minoris, S. P. .	..	4.0	55.6	48.5	37.0	31.0	22.0	3 49 13.02	62 48 46.9	42.3	51.1	53.1	48.35	. .	30.166	37.0	33.0	
	42	α Tauri	45.2	56.0	7.2	17.8	29.0	40.0	51.0	4 26 18.03	337 18 22.1	24.6	28.8	27.9	25.85	. .	30.176	37.0	32.0	
	43	ε Ursæ Minoris, S. P. .	6.4	21.5	40.5	0.0	14.0	35.0	..	5 0 19.57	58 47 63.4	55.9	62.9	64.7	61.72	. .	30.166	36.8	32.1	
	44	α Aurigæ	..	2.8	18.4	32.6	48.0	3.0	17.5	5 4 40.38	6 56 22.3	16.0	22.4	24.5	21.30	. .				
	45	β Tauri	11.0	23.0	35.0	46.5	58.5	10.8	22.4	5 15 46.74	349 34 45.2	44.9	47.2	49.1	46.60	. .	30.168	36.5	31.4	
	46	α Columbæ	38.6	51.1	4.2	16.2	29.2	42.1	54.5	5 33 16.56	286 59 39.2	40.4	46.9	48.4	43.72	. .	30.176	36.4	31.0	
	47	α Orionis	31.2	41.4	52.5	2.8	13.6	24.0	34.3	5 46 2.83	328 29 9.5	12.3	13.9	15.4	12.78	. .	30.182	36.0	30.9	
	48	α Leonis	51.0	2.0	13.0	23.0	33.8	44.8	55.0	9 59 23.23	333 49 39.2	40.7	45.4	47.3	43.15	. .	30.248	36.3	27.5	
	†49	Moon, S. L.	..	..	..	..	..	..	..	. . . .	322 23 27.6	30.3	36.2	37.2	32.82	. .	30.252	34.0	26.6	
13	50	Sun, N. L.	..	..	..	..	..	..	..	. . . .	308 5 31.5	32.7	39.4	37.9	35.37	. .	30.264	37.0	36.5	
	51	Venus, 1st and S. L. .	31.4	41.8	52.7	2.5	13.4	24.0	34.2	23 11 2.86	323 10 22.0	23.9	29.4	27.6	25.72	. .	30.216	38.0	36.6	
	52	α Andromedæ . . .	1.5	13.6	26.4	37.1	49.4	1.2	13.0	23 59 37.46	349 21 5.0	5.0	6.4	6.6	5.75	. .	30.200	39.0	37.4	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 9h.	H. Rate, 0s.
	s.	s.	s.	s.	
Feb. 11	+0.124	—0.166	—0.117	s 49.011	l .010
12	0.124	0.166	0.117	49.345	.009
13	+0.124	—0.166	—0.117	s 49.460	l .009

3. Observed with full aperture; star confused.
10. Observed at 10*h.* 11*m.* 0*s.*
20. Very unsteady; hardly worth taking.
24. Lamps burnt out; observed with illuminated wires on a dark field.
25. Observed by daylight.
27. Too faint to be observed on the horizontal wire.
49. Observed at 10*h.* 57*m.* 58*s.* Clouds cover the sky.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR, IN Æ. Clock.	COR, IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	M. S.	H. M. S.	° ′ ″	s.	″
+ 0 0.02	— 0 10.90	349 29 44.34	60.61	+ 49.00	— 0 6.04	7 35 55.61	+ 28 23 22.98	+ 12.15	—22.05
+ 0 0.32	0 0.60	359 25 52.47	. .	.00	— 0 0.16	7 42 16.95	+ 38 19 31.11	13.27	25.33
— 0 0.30	1 50.56	297 14 15.94	. .	.00	+ 0 0.07	8 1 1.47	— 23 52 5.42	7.86	21.85
— 0 0.10	0 6.72	352 30 16.43	. .	.00	— 0 0.12	8 24 30.74	+ 31 23 55.07	12.24	34.43
+ 0 0.15	0 36.77	328 4 52.10	. .	.01	0 0.03	8 38 39.41	+ 6 58 30.74	10.34	35.36
— 0 0.22	0 15.13	345 39 33.33	. .	.01	— 0 0.08	8 49 47.74	+ 24 33 11.97	11.55	39.16
— 0 0.42	1 3.09	313 6 25.37	. .	.01	+ 0 0.03	9 20 3.55	— 7 59 55.99	9.35	44.80
+ 0 0.23	0 15.23	345 34 54.90	. .	.02	— 0 0.08	9 37 8.57	+ 24 28 33.54	11.19	48.86
— 0 0.45	— 0 29.10	333 49 7.65	. .	.02	0 0.03	10 0 12.22	+ 12 42 46.29	10.41	52.62
0 0.50	+43 53.61	327 18 41.89	. .	. .	. . .	. . .	+ 6 12 20.53	. .	. .
0 0.41	+ 0 26.06	23 40 52.73	. .	.03	— 0 23.19	10 54 13.64	+ 62 34 31.37	11.97	58.65
— 0 0.48	— 1 18.26	307 9 23.34	. .	.03	+ 0 0.04	11 11 41.30	— 13 56 58.02	9.58	—64.80
+ 0 0.09	+ 2 2.82	64 19 41.21	. .	.03	+ 0 1.23	11 33 3.56	+ 76 46 40.14	11.51	+63.49
0 0.05	+ 0 16.65	15 39 3.95	. .	.04	— 0 0.31	11 45 44.37	+ 54 32 42.59	10.45	—59.34
0 0.17	— 1 47.82	298 33 36.87	. .	.04	+ 0 0.07	12 26 21.00	— 22 32 45.00	10.20	72.69
0 0.23	+10 23.27	85 24 35.05	. .	.04	0 0.67	12 31 48.61	+ 55 41 46.31	13.08	—64.67
0 0.27	1 38.62	52 36 42.57	. .						
0 0.21	1 27.48	43.19	. .						
0 0.19	1 20.40	43.27	. .						
0 0.19	1 17.99	40.06	. .	.05	2 23.30	13 3 49.15	+ 88 29 39.63	74.55	+56.08
0 0.21	1 20.05	40.08	. .						
+ 0 0.27	+ 1 38.54	41.19	. .						
— 0 0.29	— 1 9.27	310 44 52.99	. .	.06	+ 0 0.04	13 17 7.29	— 10 21 28.37	+ 10.66	—67.63
0 0.37	+ 0 43.48	35 53 4.18	61.93	.07	— 0 0.93	14 51 11.35	+ 74 46 42.82	— 0.48	38.08
0 0.05	0 49.51	39 21 58.58	. .	.08	0 26.93	15 49 38.13	+ 78 15 37.22	6.60	24.77
— 0 0.29	+ 0 57.10	43 22 59.13	. .	.09	— 0 40.86	17 1 49.68	+ 82 16 37.77	— 18.91	— 6.64
. . .	. . .	. . . .	. .	.10	+ 1 23.03	18 21 38.63	. . . .	. .	. .
+ 0 0.02	— 0 0.25	359 44 56.62	. . .	.11	— 0 0.16	18 31 43.14	+ 38 38 33.94	+ 8.53	+17.85
0 0.07	— 1 33.81	301 7 12.43	61.31	.13	0 11.08	20 43 23.39	— 19 59 10.25		
0 0.05	+ 0 18.11	16 48 8.08	. .	.27	0 0.33	0 31 48.43	+ 55 41 46.02	13.07	64.91
0 0.24	0 50.33	49 35 59.05	. .						
0 0.28	1 1.50	59.03	. .						
0 0.32	1 8.42	58.42	. .						
0 0.33	1 10.46	58.02	. .	.27	— 0 10.65	1 3 45.48	+ 88 29 36.70	+ 74.94	+56.18
0 0.32	1 8.04	57.98	. .						
0 0.28	1 1.00	58.93	. .						
0 0.24	0 49.96	59.88	. .						
+ 0 0.18	2 16.60	66 19 38 76	. .	.29	+ 0 1.18	2 51 13.88	+ 74 46 40.68	— 0.61	—38.06
— 0 0.22	+ 0 11.11	10 24 59.99	. .	.29	— 0 0.25	3 13 23.23	+ 49 18 38.03	+ 15.14	+42.88
+ 0 0.24	— 0 16.53	344 43 51.13	. .	.29	0 0.08	3 38 22.02	+ 23 37 29.07	+ 12.70	+45.77
+ 0 0.22	+ 1 57.58	62 50 45.98	. .	.30	0 24.10	3 49 38.22	+ 78 15 36.35	— 6.76	—24.70
— 0 0.11	— 0 25.42	337 18 0.32	. .	.31	— 0 0.05	4 27 7.29	+ 16 11 38.26	+ 12.06	+35.34
0 0.00	+ 1 40.02	58 49 41.74	. .	.31	+ 0 41.11	5 1 49.99	+ 82 16 40.32	— 18.99	— 6.57
+ 0 0.18	+ 0 7.39	6 56 28.87	. .	.31	— 0 7.71	5 5 21.98	+ 45 50 6.81	+ 15.15	+14.08
0 0.34	— 0 11.98	349 34 35.75	. .	.31	— 0 0.10	5 16 35.95	+ 28 28 13.39	13.03	17.20
0 0.07	3 16.99	286 59 26.80	. .	.31	+ 0 0.09	5 34 5.96	— 34 9 55.26	7.12	29.56
0 0.21	0 37.35	328 28 35.64	. .	.32	— 0 0.02	5 46 52.13	+ 7 22 13.58	11.03	+15.40
0 0.36	— 0 30.23	333 49 13.28	60.64	.35	0 0.03	10 0 12.55	+ 12 42 51.89	10.40	—52.58
0 0.13	+47 13.42	323 10 46.61	. .	. .	. . .	. . . . .	+ 2 4 24.55	. .	. .
+ 0 0.11	—17 22.80	307 48 12.68	. .	. .	. . .	. . . . .	— 13 18 8.71	. .	. .
— 0 0.28	0 2.56	323 10 22.78	. .	.37	0 0.00	23 11 53.98	+ 2 4 1.49	. .	. .
— 0 0.02	— 0 11.31	349 20 54.41	. .	49.37	— 0 0.10	0 0 26.73	+ 28 14 33.02	+ 12.10	+72.48

NADIR POINTS. A.	B.	C.	D.	Means
	Feb.11	9*h*., 45	*m*.	° ′ **179 59**
60″0	59″2	61″3	62″4	60″72
60.3	58.8	61.3	61.8	60.55
60.4	59.4	61.3	62.2	60.83
59.5	59.0	61.5	61.8	60.45
60.2	58.8	61.2	61.9	60.52
60.08	59.04	61.32	62.02	60.61
	Feb.11	16*h*.		**179 59**
61.3	60.0	63.2	62.2	61.82
61.3	60.7	62.6	62.5	61.78
61.5	60.5	63.2	62.8	62.00
61.0	60.4	63.3	62.8	61.88
61.2	60.8	63.8	62.9	62.17
61.26	60.60	63.20	62.64	61.93
	Feb.12	5*h*.		**179 59**
60.5	59.8	62.7	62.5	61.38
60.2	59.0	62.0	62.5	60.92
60.9	59.2	62.4	62.5	61.25
61.0	59.8	63.1	62.6	61.62
60.6	59.5	62.8	62.6	61.38
60.64	59.46	62.60	62.54	61.31
	Feb.12	21*h*.		**179 59**
58.9	59.5	61.5	62.5	60.60
58.4	60.2	60.5	62.2	60.32
59.2	60.2	61.5	62.2	60.78
59.0	60.0	61.5	62.5	60.75
59.1	59.6	61.3	62.1	60.53
59.1	60.0	61.3	62.6	60.75
59.1	59.8	61.5	61.8	60.55
58.6	59.6	61.2	62.0	60.60
59.0	59.4	61.3	61.8	60.38
59.5	60.2	62.2	62.5	61.10
58.99	59.85	61.38	62.22	60.64

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	M. S.	′ ″
Venus .	+ 0 1.75	

Feb. 11. Error of Runs +0″.84.
" 12. do. do. +0.81.
" 12, 21*h*. Nadir Point advanced one division.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Feb. 13	1	α Cassiopeiæ	3.5	22.0	41.2	59.0	18.2	37.0	54.5	0 30 59.34	16 47 50.6	43.7	48.1	51.0	48.35	. .	30.184	39.6	37.5	H.
	2		11.0								49 35 13.0	3.0	11.1	12.3	9.85	. .	30.180	39.7	37.5	
	3			44.0							34 60.3	49.9	57.9	60.5	57.15	. .				
	†4	Polaris			37.0					0 56 28.20	54.5	44.2	51.3	54.4	51.10	. .				
	5					59.0					51.0	40.4	48.5	50.8	47.68	. .	30.182	39.8	37.9	
	†6						50.0				54.4	43.8	51.4	55.0	51.15	. .				
	7	η Tauri	58.2	9.6	21.8	32.3	44.0	55.8	6.8	3 37 32.64	344 44 5.5	5.5	7.2	7.4	6.40	. .	30.182	39.1	34.5	
	8	α Tauri	45.0	55.8	6.5	17.2	28.8	39.8	50.2	4 26 17.61	337 18 21.0	21.5	26.5	26.2	23.80	. .	30.184	38.5	33.0	
	9	α Aurigæ	47.5	2.5	18.0	32.1	47.6	3.0	17.6	5 4 32.60	6 56 20.8	15.2	21.3	23.4	20.18	. .	30.185	38.0	32.5	
	10	α² Geminorum . . .	22.5	34.4	47.1	59.2	11.8	24.5	36.4	7 23 59.41	353 19 31.6	31.7	32.7	35.2	32.80	. .	30.176	35.7	30.9	
	11	α Canis Minoris . . .	55.8	6.0	17.2	26.6	37.8	48.2	58.5	7 30 27.16	326 43 39.5	40.5	47.8	47.5	43.82	. .	30.172	35.6	30.8	
	12	β Geminorum . . .	30.8	42.7	54.8	6.2	18.5	30.5	41.7	7 35 6.44	349 29 55.0	55.1	57.8	58.9	56.70	. .	30.168	35.5	30.8	
16	†13	α Tauri	44.2	55.0	6.0	16.5	27.8	38.3	49.2	4 26 16.71	337 18 13.1	14.0	16.3	18.5	15.48	. .	29.954	39.5	34.6	
	14	α Aurigæ	46.8	1.0	17.0	31.3	47.0	2.0	16.4	5 4 31.64	6 56 17.9	9.0	14.2	18.7	14.95	. .	29.966	39.5	32.6	
	15	β Tauri	10.0	21.5	34.0	45.2	57.5	9.8	21.2	5 15 45.60	349 34 37.6	37.8	39.6	40.7	38.93	. .	29.970	39.5	33.1	
	16	α Leporis	34.5	45.4	56.8	7.2	18.7	29.8	40.2	5 25 7.51	303 11 15.0	13.0	17.0	20.0	16.25	. .	29.974	39.2	32.5	
	17	α Columbæ	37.7	50.0	3.4	15.2	28.0	41.0	53.0	5 33 15.47	286 59 31.2	30.0	34.3	37.5	33.25	. .	29.975	39.0	32.5	
	18	α Orionis	29.8	40.7	51.6	1.7	12.4	23.0	33.0	5 46 1.74	328 29 5.0	2.0	3.7	6.5	4.30	. .	29.984	39.0	32.3	
	19								58.0		54 29 10.0	0.8	8.6	11.8	7.80	. .	30.006	38.6	35.2	
	20							48.0			16.5	6.0	15.0	16.2	13.42	. .				
	21						45.0				16.8	6.8	15.8	17.0	14.10	. .				
	†22	δ Ursæ Minoris, S. P.				46.0				6 20 42.57	19.2	8.1	17.4	18.7	15.85	. .	30.004	38.7	35.7	
	23				33.0						15.8	5.6	15.7	15.5	13.15	. .				
	24			37.0							13.8	2.6	12.1	13.5	10.50	. .				
	25		31.0								10.3	0.0	9.0	9.5	7.20	. .	29.992	38.7	35.0	
	26	Bessel's Zone, 511. .	43.8	58.5	13.6	27.2	42.2	56.8	10.8	6 37 27.56	5 1 36.5	30.6	35.0	40.3	35.60	. .	30.008	38.7	34.5	
	27	α² Geminorum . . .	21.5	33.8	46.2	58.0	11.0	24.0	35.3	7 23 58.54	353 37 26.4	24.6	26.3	28.0	26.33	. .	30.018	37.8	32.0	
	†28	α Canis Minoris . . .	55.0	5.2	16.1	26.0	37.0	47.5	58.0	7 30 26.40	327 1 32.0	33.0	37.3	39.2	35.38	. .				
18	†29	Sun, 1st and N. L. .	51.0	2.5	12.2	23.5	34.2	45.0	55.5	22 5 23.42	309 48 4.0	1.5	6.2	8.8	5.12	. .	30.090	38.5	44.4	P.
	30			43.5							49 34 59.8	47.4	52.2	56.8	54.05	. .	30.242	38.3	37.0	
	31				22.0						50.5	38.2	43.0	47.8	44.87	. .	30.023		37.0	
	32					59.5					48.6	37.6	40.6	46.0	43.20	. .				
	33	Polaris.					45.5			1 6 22.92	49.5	39.5	44.3	48.5	45.45	. .				
	34							29.0			54.5	43.5	49.0	53.0	50.00	. .	30.024	39.2	36.0	
	35								58.0		63.5	54.2	58.2	63.5	59.85	. .				
	36	Jupiter, 1st and 2d L.	..	7.0	18.0	28.4	41.0	51.0	1.0	2 13 34.40	333 34 14.2	11.2	13.4	13.2	13.00	. .	30.240	38.0	35.0	
	37		..	10.0	21.0	31.0	42.7	53.2	3.5	2 13 36.90										
	38	Mars, 1st L. . . .	6.3	17.1	28.2	39.0	50.0	1.0	11.8	2 18 39.06	335 51 12.7	11.3	14.2	12.5	12.67	. .	30.240	38.0	35.0	
	39	α Persei	44.1	0.5	16.2	32.5	49.1	5.4	20.7	3 12 32.64	10 24 47.2	42.2	43.6	46.6	44.90	. .	30.258	37.5	33.2	
	40	η Tauri	57.0	8.2	19.9	31.1	42.5	54.2	5.2	3 37 31.16	344 44 2.5	2.6	2.5	5.0	3.15	. .	30.250	36.5	32.2	
	41	γ¹ Eridani	28.5	39.0	50.2	1.0	11.9	23.0	33.5	3 50 1.01	307 10 24.2	18.8	23.4	25.2	22.90	. .	30.264	37.0	32.0	
	42	α Tauri	43.5	54.4	5.2	16.0	27.0	38.0	49.0	4 26 16.16	337 18 20.2	17.2	19.8	22.5	19.92	. .	30.276	36.5	30.6	
	43	Bessel's Zone, 513. .	31.0	43.0	55.0	6.7	19.0	31.0	43.4	4 59 7.01	350 42 7.0	4.4	6.3	6.2	5.98	. .	30.252	36.0	29.2	
	44	δ Orionis	48.0	58.2	8.7	19.0	29.6	40.5	50.5	5 23 19.21	320 41 48.0	47.2	51.3	53.0	49.87	. .	30.252	35.0	28.5	
	45	Bessel's Zone, 513. .	13.4	26.0	38.0	49.9	2.5	14.5	26.3	5 31 50.08	350 52 27.6	29.5	30.2	28.0	28.88	. .	30.250	35.0	27.8	
	†46	α Orionis	29.5	40.0	50.5	1.0	11.8	22.5	33.0	5 46 1.19	328 29 12.0	9.5	11.4	11.7	11.15	. .	30.252	35.0	27.5	
	47	κ Orionis	9.2	21.5	33.0	45.2	57.7	10.0	21.5	6 4 45.44	351 39 16.6	17.6	19.2	19.5	18.22	. .	30.252	35.0	27.3	
	48	Aurigæ, 2182 . . .	20.5	35.0	49.5	4.4	19.5	34.0	49.0	6 31 4.56	5 46 6.2	0.5	4.6	5.2	4.12	. .	30.276	34.0	36.5	
	49	ε Canis Majoris . . .	9.2	21.5	33.2	45.1	57.4	9.5	21.4	6 51 45.33	292 22 23.2	20.6	26.8	25.3	23.98	. .	30.270	34.0	26.0	
	50	Anonymous . . .	13.2	28.0	43.0	57.2	12.7	28.0	42.3	7 12 57.77	6 13 44.0	43.0	45.2	47.0	44.80	. .	30.290	34.0	25.5	
	51	Bessel's Zone, 492. .	12.0	26.0	40.0	54.2	8.0	22.0	36.2	7 23 54.05	2 53 55.0	43.0	54.0	56.2	54.90	. .	30.290	34.0	25.0	
	52	α Lyræ	10.3	25.6	39.0	52.3	6.0	19.3	32.2	18 30 52.10	359 44 46.0	41.7	43.4	44.9	44.00	. .	30.198	27.5	26.0	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 5h.	H. Rate. 0s.
	s.	s.	s.	s.	
Feb. 13	+0.124	—0.166	—0.117	s 49.424	l .009
16	.124	.166	.117	50.347	.013
18	+0.028	—0.242	—0.098	s 50.914	l .014

4. Sky hazy.
6. Cloudy.
13. Microscope A cannot be read without great difficulty—requires adjustment of focus.
22. Very unsteady; microscopes read with great difficulty.
28. Stars very unsteady, and hardly worth observing.
29. Before this observation, all the wires of the diaphragm were accidently broken out, and new ones inserted.
46. Observed with full aperture.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.02	+ 0 18.15	16 48 6.52	60.96	+ 49.38	− 0 0.33	0 31 48.39	+ 55 41 44.81	+ 13.09	+65.08
0 0.05	0 50.43	49 35 60.33	. .						
0 0.05	1 1.51	58.71	. .						
0 0.06	1 8.44	59.60	. .	.38	+ 6 27.80	1 3 45.38	+ 88 29 37.51	75.68	56.39
0 0.06	1 10.49	58.23	. .						
0 0.06	+ 1 8.03	59.24	. .						
+ 0 0.18	− 0 16.51	344 43 50.07	. .	.41	− 0 0.08	3 38 21.97	+ 23 37 28.36	12.72	45.81
− 0 0.08	− 0 25.37	337 17 58.35	. .	.42	0 0.05	4 27 6.98	+ 16 11 36.64	12.07	35.40
+ 0 0.13	+ 0 7.39	6 56 27.70	. .	.42	0 0.22	5 5 21.80	+ 45 50 5.99	15.17	+14.03
− 0 0.30	− 0 7.13	353 19 25.37	. .	.45	0 0.12	7 24 48.74	+ 32 13 3.66	12.74	−20.04
− 0 0.34	0 39.99	326 43 3.69	. .	.45	0 0.01	7 31 16.60	+ 5 36 41.78	10.29	20.35
+ 0 0.01	0 11.30	349 29 45.41	. .	.45	0 0.10	7 35 55.79	+ 28 23 23.70	12.16	−22.18
0 0.00	− 0 25.09	337 17 50.39	53.89	50.34	0 0.05	4 27 7.00	+ 16 11 37.75	12.12	+35.51
0 0.00	+ 0 7.34	6 56 22.29	. .	.35	0 0.22	5 5 21.77	+ 45 50 7.65	15.24	13.91
0 0.00	− 0 11.08	349 34 27.85	. .	.35	− 0 0.10	5 16 35.85	+ 28 28 13.21	13.09	17.17
0 0.00	1 31.95	303 9 44.30	. .	.35	+ 0 0.05	5 25 57.91	− 17 56 30.34	9.02	29.32
0 0.00	3 15.10	286 56 18.15	. .	.35	+ 0 0.09	5 34 5.91	− 34 9 56.49	7.20	30.13
0 0.00	− 0 36.99	328 28 27.31	. .	.36	− 0 0.02	5 46 52.08	+ 7 22 12.61	+ 11.09	15.59
0 0.00	+ 1 32.84	54 30 40.64	. .						
0 0.00	1 27.88	41.30	. .						
0 0.00	1 24.82	38.92	. .						
0 0.00	1 23.93	39.78	. .	.36	+ 0 4.88	6 21 37.81.	+ 86 35 34.93	− 56.84	+15.38
0 0.00	1 25.07	38.22	. .						
0 0.00	1 28.23	38.73	. .						
0 0.00	1 33.18	40.38	. .						
0 0.00	+ 0 5.30	5 1 40.90	. .	.37	− 0 0.19	6 38 17.74	+ 43 55 26.26	+ 14.56	−10.10
0 0.00	− 0 6.75	353 37 19.58	. .	.38	0 0.12	7 24 48.80	+ 32 13 4.94	12.76	20.27
0 0.00	0 39.68	326 42 55.70	. .	.38	0 0.04	7 31 16.74	+ 5 36 41.06	10.32	−20.17
+ 0 0.01	−17 17.32	309 30 47.80	54.01	.82	0 0.12	22 7 20.24	− 11 35 26.96	. .	. .
− 0 0.45	+ 1 1.64	49 35 55.24	. .						
0 0.38	1 8.45	52.94	. .						
0 0.37	1 10.63	53.46	. .						
0 0.38	1 8.20	53.27	. .	.86	3 33.26	1 3 40.52	+ 88 29 33.54	78.64	+57.53
0 0.42	1 1.24	50.82	. .						
0 0.50	+ 0 49.96	49.31	. .						
0 0.25	− 0 29.37	333 33 43.78	. .	.87	0 5.51	2 14 21.01	+ 12 27 28.62	. .	. .
0 0.04	− 0 24.98	335 50 47.65	. .	.87	0 0.14	2 18 29.79	+ 14 44 32.89	. .	. .
− 0 0.15	+ 0 9.91	10 24 54.65	. .	.88	0 0.40	3 13 23.12	+ 49 18 39.89	15.30	43.26
+ 0 0.19	− 0 16.62	344 43 46.72	. .	.89	0 0.19	3 38 21.86	+ 23 37 31.96	12.81	46.06
− 0 0.31	1 20.24	307 9 2.35	. .	.90	0 0.02	3 50 51.89	− 13 57 12.41	10.17	55.44
0 0.07	0 25.57	337 17 54.35	. .	.91	0 0.15	4 27 6.92	+ 16 11 39.59	12.16	35.58
− 0 0.02	0 10.03	350 41 55.93	. .	.91	0 0.22	4 59 57.70	+ 29 35 41.17	13.26	22.33
+ 0 0.03	0 50.21	320 40 59.69	. .	.92	0 0.07	5 24 10.06	− 0 25 15.07	10.59	24.93
− 0 0.30	0 9.65	350 52 18.93	. .	.92	0 0.22	5 32 40.78	+ 29 46 4.17	13.19	12.77
+ 0 0.17	0 37.70	328 28 33.28	. .	.92	0 0.10	5 46 52.01	+ 7 22 18.52	11.12	15.67
− 0 0.06	− 0 10.13	350 30 8.03	. .	.93	0 0.22	6 5 36.15	+ 29 32 53.27	13.04	+ 3.16
0 0.21	+ 0 6.11	5 46 10.02	. .	.94	− 0 0.35	6 31 55.15	+ 44 39 55.26	14.74	− 8.75
− 0 0.28	− 2 29.00	292 19 54.70	. .	.94	+ 0 0.05	6 52 36.32	− 28 46 20.06	7.44	+ 2.77
+ 0 0.25	+ 0 6.75	6 13 51.80	. .	.94	− 0 0.35	7 13 48.36	+ 45 7 37.04	14.44	−20.28
+ 0 0.02	+ 0 3.12	2 53 58.04	. .	.95	0 0.32	7 24 44.68	+ 41 47 31.30	13.91	−22.39
− 0 0.10	− 0 0.25	359 44 43.65	54.01	. .	− 0 0.29	. . .	+ 38 38 28.80	+ 8.33	+19.26

NADIR POINTS.				
A.	B.	C.	D.	Means
	Feb.13	Day.		° ′ 179 59
60″6	61″2	60″3	61″6	60″92
60.1	60.8	60.4	61.8	60.77
60.5	60.5	60.8	62.0	60.95
60.3	61.0	60.7	62.2	61.05
60.3	61.2	60.5	62.4	61.10
60.36	60.94	60.54	62.00	60.96
	Feb.16			179 59
54.1	52.0	52.4	56.0	53.62
54.5	53.0	53.1	55.8	54.10
54.0	53.0	53.0	56.0	54.00
54.0	52.6	52.7	55.8	53.77
54.6	52.5	52.5	56.2	53.95
54.24	52.62	52.74	55.96	53.89
	Feb.18	20*h*.		179 59
54.7	53.3	53.2	55.3	54.12
54.5	52.8	53.3	55.2	53.95
54.8	53.8	53.1	54.9	54.15
54.0	53.2	53.4	55.3	53.97
54.2	53.5	52.7	55.1	53.87
54.44	53.32	53.14	55.16	54.01

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Sun .	+ 1 6.12	
Mars .	+ 0 0.19	

Feb. 13. Error of Runs + 0″60.
" 16. do. do. 0.00.
" 18. do. do. + 0.62.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THERS.		Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.	Ex.	
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Feb. 20	†1	Sun, 1st and N. L.	31.2	42.2	53.0	4.0	14.2	25.2	35.8	22 14 9.93	310 31 49.5	48.0	54.0	55.8	51.80	. .	29.352	37.5	38.2	H.
	†2	Sun, 2d L.	43.8	55.0	5.2	16.0	27.0	38.0	48.5											
	3	Venus, 1st and S. L.	46.1	56.5	6.8	17.1	28.0	38.6	49.0	23 1 17.44	323 31 30.8	30.7	35.5	34.4	32.80	. .	29.350	38.0	39.5	
	†4	γ Cephei	54.0	40.0	..	..	..	44.5	29.0	23 32 11.88	. . . .	..	..	..	. .	. .				
	5	α Cygni	35.0	49.2	4.0	18.2	33.0	49.0	3.3	20 35 18.81	5 50 13.8	16.0	9.8	14.2	13.25	. .	29.650	37.3	39.0	
	6	α Cephei	54.2	16.0	39.0	1.0	23.6	46.2	8.0	21 14 1.14	23 1 67.0	55.8	62.0	64.6	62.35	. .	29.696	38.0	40.0	
	7	β Cephei	14.0	44.3	15.0	45.3	16.3	47.0	17.0	21 25 45.56	30 58 63.2	50.0	55.1	58.3	56.65	. .	29.692	38.5	40.0	
	†8	Mercury, (centre)	47.0	57.5	8.3	19.3	31.0	42.0	52.5	21 42 19.65	305 10 43.3	39.0	46.2	46.2	43.67	. .	29.690	39.0	40.3	
21	9	Sun, 1st and S. L.	20.9	31.5	42.0	52.6	4.0	14.2	25.0	22 17 58.82	310 21 5.0	2.8	8.8	7.8	6.10	. .	29.678	39.8	43.2	
	10	Sun, 2d L.	33.0	43.3	54.0	4.5	15.5	26.2	36.8											
	†11	Venus, 1st and S. L.	52.1	..	14.0	..	34.5	45.0	55.5	22 59 28.22	323 29 16.0	15.3	19.2	17.0	16.87	. .	29.670	40.0	41.5	
	12	α Andromedæ	59.0	10.9	22.8	34.7	46.3	58.8	10.3	23 59 34.69	349 21 2.1	0.4	1.2	2.5	1.55	. .	29.664	40.8	41.7	
	13	Polaris	0.0								49 35 11.3	0.2	9.5	9.2	7.55	. .	29.646	41.0	41.7	
	14			42.0							34 59.3	48.6	57.5	58.8	56.05	. .				
	15				21.0						52.2	40.4	50.0	51.8	48.60	. .				
	16					57.0				1 3 1.71	49.8	38.6	48.4	49.9	46.68	. .	29.634	41.1	41.5	
	17						45.0				52.2	40.1	49.0	51.4	48.18	. .				
	18							29.0			60.2	48.1	57.1	59.1	56.12	. .				
	†19								58.0		35 12.3	1.0	8.0	10.3	7.90	. .	29.642	41.4	41.6	
	20	51 (Hev.) Cephei	10.5								48 20 65.0	55.0	60.6	64.3	61.22	. .	29.640	39.5	34.8	
	21			51.0							58.2	48.2	53.1	57.8	54.32	. .				
	22				30.0						54.3	44.0	49.2	54.0	50.37	. .				
	23					8.0				6 26 10.36	52.0	42.0	47.4	52.2	48.40	. .	29.636	39.3	34.4	
	24						52.0				53.2	43.3	48.8	54.1	49.85	. .				
	25							34.0			57.7	47.5	52.3	57.3	53.70	. .				
	26								7.0		64.5	54.7	59.0	63.7	60.47	. .	29.632	39.0	33.9	
	27	ε Canis Majoris	8.3	20.2	32.1	44.3	56.2	8.6	20.0	6 51 44.24	292 22 19.4	18.5	25.7	25.7	22.27	. .	29.634	39.0	33.5	
	†28	α² Geminorum, (ref.)	19.2	..	..	..	9.0	..	..	7 23 44.10	186 40 26.5	26.2	29.0	27.9	27.40	. .	29.634	38.8	33.0	
	29	α Canis Minoris	53.0	3.3	14.0	24.4	35.0	46.0	56.0	7 30 24.53	326 43 35.2	36.2	42.0	41.7	38.77	. .				
	30	β Geminorum	28.0	40.2	51.3	3.3	15.5	28.0	39.3	7 35 3.66	349 29 52.6	52.8	55.1	57.2	54.42	. .	29.636	38.8	32.5	
	31	15 Argus	35.0	46.3	57.8	9.2	21.0	32.7	44.0	8 0 9.43	297 15 59.0	57.0	66.2	66.0	62.05	. .	29.622	37.8	30.7	
23	†32	Sun, 2d and N. L.	10.0	20.5	31.0	41.8	52.6	3.0	14.0	22 25 41.84	311 36 59.5	48.0	54.2	53.5	53.80	. .				P.
	33	Venus, 1st and S. L.	50.2	0.5	11.0	21.5	32.2	..	53.0	22 55 18.07	323 20 36.5	25.4	30.8	28.5	30.05	. .				
	34	Polaris	0.0								49 34 67.9	56.0	67.0	65.9	64.20	. .	29.946	38.0	37.3	H.
	35			43.0							56.3	45.1	55.6	55.0	53.00	. .				
	36				20.0						50.2	38.3	49.5	47.3	46.33	. .				
	37					59.0				1 3 2.43	46.5	35.4	46.0	44.3	43.05	. .	29.936	38.0	37.3	
	38						45.0				49.1	37.3	49.5	47.4	45.82	. .				
	39							32.0			57.5	46.3	58.7	54.7	54.30	. .				
	40								58.0		69.6	58.5	68.1	66.7	65.73	. .	29.938	38.0	37.4	
	41	α Arietis	5.0	16.1	27.2	38.8	50.3	2.0	13.0	1 57 38.91	343 50 34.0	33.0	35.1	34.5	34.15	. .	29.950	38.1	37.7	
	42	Jupiter, 1st, 2d & S. L.	3.1	..	24.8	..	46.3	..	8.0	2 16 36.79	333 51 10.0	11.0	14.8	13.0	12.20	. .	29.940	38.0	37.8	
	43		..	16.6	..	38.0	..	59.5	..											
	44	α Aurigæ	44.2	59.5	14.2	29.2	45.0	59.8	14.2	5 4 29.44	6 56 19.2	13.6	21.2	21.0	18.75	. .	29.980	37.5	33.5	
	45	β Tauri	8.2	19.5	..	43.1	55.0	8.0	19.0	5 15 45.47	349 34 45.0	44.4	50.3	45.0	46.18	. .	29.978	37.5	33.4	
	46	α Leporis	32.0	43.4	54.0	5.3	16.4	27.6	38.3	5 25 5.29	303 11 17.3	18.0	24.2	21.0	20.13	. .	29.974	37.5	33.7	
	†47	α Columbæ	..	48.0	0.6	13.2	26.1	39.2	..	5 33 13.42	286 59 35.3	35.1	41.8	40.5	38.18	. .	29.984	37.3	33.5	
	48	α Orionis	28.0	38.3	49.2	59.3	10.2	21.1	31.2	5 45 59.61	328 29 6.3	7.2	12.0	9.4	8.72	. .	29.986	37.0	33.6	
	49	κ Aurigæ	..	20.0	32.3	43.0	56.2	8.2	20.0	6 4 49.95	350 39 19.0	16.6	23.0	19.5	19.52	. .	29.986	37.0	33.5	
	50	δ Ursæ Minoris, S. P.							55.0		54 29 15.5	4.7	16.0	11.5	11.92	. .	29.988	37.0	32.1	
	51							46.0			21.0	10.5	21.7	18.5	17.93	. .				
	52						44.0				22.2	12.6	24.1	20.0	19.72	. .				

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 10h.	0s.
	s.	s.		s.	
Feb. 20	+0.028	—0.242	—0.0[illegible]	s 51.895	l .010
21	0.028	0.242	0.098	52.111	.010
23	+0.028	—0.242	—0.098	s 52.423	l .009

1 to 4. Clock correction doubtful.
2. Observed the transit of both limbs in the upper part of the field.
4. A flying cloud covered the star. Clouds prevented all farther observations.
8. Too tremulous to observe either limb.
11. Flying clouds interrupted the observation.
19. Last observation through clouds.
28. Mercury disturbed by persons walking in the next room.
32. Observed N. L., after its transit at wire VII.
47. Observed through clouds.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
− 0 0.08	−17 12.86	310 14 38.94	59.67	+ 51.73	− 0 0.02	22 15 1.64	− 10 51 41.48	. .	. .
− 0 0.10	+ . 2.95	323 31 35.75	. .	.74	0 0.06	23 2 11.01	+ 2 25 15.23	. .	. .
. . .	. . .	. . . .	. .	.75	0 1.74	23 33 1.89	. . . .	+ 11.84	+65.94
+ 0 0.11	0 5.99	5 50 19.37	58.35	.97	0 0.35	20 36 10.43	+ 44 44 0.27	8.76	50.53
0 0.11	0 25.03	23 2 27.55	. .	.98	0 0.63	21 14 52.49	+ 61 56 8.45	7.22	56.90
0 0.12	0 33.95	30 59 30.78	. .	.98	0 0.92	21 26 36.62	+ 69 53 11.68	5.62	57.75
+ 0 0.14	− 1 18.16	305 9 25.72	. .	.98	0 0.01	21 43 11.62	− 15 56 53.38	. .	. .
− 0 0.03	+15 8.80	310 36 14.88	. .	.99	0 0.02	22 18 50.79	− 10 30 4.22	. .	. .
+ 0 0.18	+ 0 2.92	323 29 19.92	. .	52.00	0 4.29	23 0 17.84	+ 2 23 0.82	. .	. .
0 0.00	− 0 11.03	349 20 50.52	. .	.01	0 0.21	0 0 26.49	+ 28 14 31.42	12.16	73.82
+ 0 0.18	+ 0 48.45	49 35 56.18	. .						
0 0.22	1 0.04	56.31	. .						
0 0.25	1 6.55	55.40	. .						
0 0.25	1 8.70	55.63	. .	.02	0 12.90	1 3 40.82	+ 88 29 36.53	80.22	+58.09
0 0.25	1 6.23	54.66	. .						
0 0.22	0 59.01	55.35	. .						
0 0.18	0 47.82	55.90	. .						
0 0.00	0 55.48	48 21 56.70	59.37						
0 0.02	1 1.74	56.08	. .						
0 0.03	1 5.28	55.68	. .						
0 0.04	1 6.70	55.14	. .	.07	− 0 7.08	6 26 55.35	+ 87 15 35.59	96.84	−17.46
0 0.03	1 5.35	55.23	. .						
+ 0 0.02	1 1.55	55.27	. .						
0 0.00	+ 0 55.37	55.84	. .						
− 0 0.22	− 2 23.45	292 19 58.60	. .	.08	+ 0 0.05	6 52 36.37	− 28 46 21.52	7.49	+ 3.26
0 0.25	+ 0 6.89	186 41 34.55	. .	.08	+ 0 12.46	7 24 48.64	+ 32 13 3.92	12.82	−20.64
− 0 0.24	− 0 39.07	326 42 59.97	. .	.09	− 0 0.09	7 31 16.53	+ 5 36 39.34	10.36	19.93
+ 0 0.02	0 11.06	349 29 43.38	. .	.09	− 0 0.21	7 35 55.54	+ 28 23 23.26	12.23	22.66
− 0 0.18	1 55.59	297 14 6.24	. .	.09	+ 0 0.03	8 1 1.55	− 23 52 13.84	7.94	−19.83
+ 0 0.18	−17 14.31	311 20 39.67	40.00	.32	− 0 0.03	22 26 28.51	− 9 46 21.08	. .	. .
0 0.08	+ 0 2.69	323 21 32.82	. .	.32	+ 0 3.44	22 56 15.77	+ 2 14 32.07	. .	. .
0 0.28	0 49.77	49 35 54.25	. .						
0 0.34	1 1.76	55.10	. .						
0 0.38	1 7.80	54.51	. .						
0 0.39	1 9.94	53.38	59.77	.34	− 0 12.90	1 3 41.87	+ 88 29 33.67	81.44	+58.47
0 0.38	1 7.46	53.66	. .						
0 0.34	1 0.21	54.85	. .						
0 0.28	+ 0 48.98	54.99	. .						
+ 0 0.13	− 0 17.28	343 50 17.00	. .	.35	0 0.18	1 58 31.08	+ 22 43 55.81	12.72	66.26
− 0 0.06	− 0 11.38	333 51 0.76	. .	.35	0 0.13	2 17 28.92	+ 12 44 40.24	. .	. .
+ 0 0.21	+ 0 7.33	6 56 26.29	60.44	.37	0 0.35	5 5 21.46	+ 45 50 5.10	15.41	13.73
− 0 0.54	− 0 11.08	349 34 34.56	. .	.37	− 0 2.22	5 16 35.62	+ 28 28 13.37	13.22	17.14
+ 0 0.20	1 31.76	303 9 48.57	. .	.38	0 0.00	5 25 57.67	− 17 56 32.62	9.15	29.89
0 0.12	3 14.71	286 56 23.59	. .	.38	+ 0 0.04	5 34 5.84	− 34 9 57.60	7.35	30.88
+ 0 0.27	0 36.91	328 38 32.06	. .	.38	− 0 0.10	5 46 51.89	+ 7 22 10.89	11.19	15.84
− 0 0.10	0 9.92	350 39 9.50	. .	.39	− 0 6.26	6 5 36.08	+ 29 32 48.31	+ 13.12	+ 3.01
+ 0 0.25	1 33.78	54 30 45.95	. .						
0 0.22	1 28.78	46.93	. .						
0 0.21	1 25.59	45.52	60.44	.39	+ 0 23.98				

NADIR POINTS. A.	B.	C.	D.	Means
	Feb.20	Day.		° ′
				179 59
59″5	59″0	59″2	60″9	59″65
59.5	59.3	59.4	60.5	59.67
59.5	59.0	59.1	60.7	59.57
59.6	59.0	59.0	60.8	59.60
59.8	59.4	59.3	60.8	59.82
59.58	59.14	59.20	60.74	59.66
	Feb.21	Day.		179 59
59.4	58.0	56.5	59.8	58.42
59.3	58.0	56.6	60.0	58.47
59.3	58.1	56.2	60.2	58.45
59.0	57.3	56.0	59.5	57.95
59.0	57.6	56.8	60.4	58.45
59.20	57.80	56.42	59.98	58.35
	Feb.21	Night.		179 59
60.5	59.0	58.5	60.5	59.62
59.5	58.1	58.0	60.3	58.97
60.0	58.5	58.3	60.8	59.40
59.9	58.8	58.8	60.8	59.57
60.0	58.4	58.0	60.8	59.30
60.98	58.56	58.30	60.64	59.37
	Feb.23	Noon.		179 59
46.8	38.2	40.0	38.0	40.75
46.8	37.2	36.4	36.7	39.27
47.5	37.7	37.8	38.2	40.30
45.5	37.2	36.2	36.5	38.85
47.0	38.5	38.2	38.0	40.42
46.9	37.2	36.5	35.5	39.02
47.6	37.2	37.8	37.8	40.10
48.2	37.6	38.6	38.2	40.65
48.2	37.6	38.6	38.2	40.65
48.2	37.6	36.8	37.4	40.00
47.27	37.60	37.69	37.45	40.00
	Feb.23	Day.		179 59
60.6	60.5	61.0	60.4	60.62
59.0	59.0	59.6	59.0	59.15
59.0	59.4	60.0	58.8	59.30
59.3	59.2	61.1	59.8	59.85
59.8	59.7	61.0	60.3	60.20
59.4	59.8	60.8	59.5	59.87
59.3	59.5	61.0	59.5	59.82
59.0	59.1	60.8	59.1	59.50
59.0	59.5	61.1	59.8	59.85
59.0	59.0	60.7	59.6	59.57
59.34	59.47	60.71	59.58	59.77

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Venus .	+ 0 1.89	
Venus .	+ 0 1.91	
Sun .	− 1 5.65	
Venus .	+ 0 1.94	

Feb. 20. Error of Runs, +0″21.
" 21. do. do. 0.51.
" 23. do. do. 0.61.
" 23. do. do. +0.93.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	T
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		A
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	
Feb. 23	1	δ Ursæ Minoris, S. P.				45.0				6 20 13.08	54 29 23.5	13.9	25.5	20.7	20.90	. .		
	2			35.0							20 7	10.5	22.5	18.0	17.92	. .		
	3		33.5								15.5	4.8	16.5	11.2	12.00	. .	29.978	36
	†4	ε Canis Majoris	8.0	19.8	32.0	44.0	56.0	8.0	19.3	6 51 43.87	292 22 21.0	20.3	30.1	25.7	24.28	. .	29.980	36
	†5	δ Geminorum	31.3	43.0	54.0	5.3	17.0	28.4	..	7 9 59.83	343 22 3.3	3.2	9.8	6.4	5.68	. .	29.982	36
	6	α² Geminorum	19.0	31.3	44.0	56.5	9.0	22.5	33.2	7 23 56.50	353 19 32.4	31.3	33.1	32.7	32.37	. .	29.990	36
	7	α Canis Minoris	52.8	3.0	13.4	23.8	35.0	45.5	56.0	7 30 24.21	326 43 38.0	39.2	46.0	43.6	41.70	. .	29.988	36
	8	β Geminorum	..	..	51.6	3.4	15.4	27.8	39.3	7 35 15.50	349 29 53.2	53.1	59.5	54.8	55.15	. .	29.986	36
	9	ι Ursæ Majoris	1.8	17.3	33.2	49.1	5.2	21.1	36.5	8 47 49.17	9 44 31.4	25.1	32.0	29.0	29.38	. .	39.986	35
	10	α Hydræ	39.4	50.0	0.2	11.0	21.8	32.8	43.0	9 19 11.17	313 7 17.2	26.9	34.7	29.4	27.05	. .	29.994	35
	†11	ε Leonis	..	..	..	..	..	39.0	50.3	9 36 44.65	345 35 1.0	9.3	14.7	11.2	9.05	. .	29.992	35
	12	α Leonis	48.0	58.3	9.2	19.9	31.0	42.0	52.2	9 59 20.09	333 49 28.0	36.9	41.2	39.2	36.33	. .	29.996	35
	13	α Ursæ Majoris	13.6	36.5	59.2	21.5	45.2	8.2	30.5	10 53 22.10	23 40 22.2	24.2	32.2	30.3	27.22	. .	29.998	34
	14	δ Leonis	31.0	42.2	53.2	5.0	16.2	27.2	38.8	11 5 4.80	342 28 10.5	22.1	27.0	23.2	20.70	. .	30.002	34
	15	δ Hydræ et Crateris	16.3	27.2	38.0	48.4	59.5	11.0	31.3	11 11 48.81	307 10 28.0	36.2	44.0	43.5	37.93	. .	30.004	34
	16	γ Cephei, S. P	50.8	35.0	21.2	8.0	54.0	39.5	26.0	11 32 7.79	64 17 32.1	30.6	41.4	38.9	35.75	. .	30.008	34
	17	β Leonis	49.2	0.3	11.1	22.2	33.3	44.1	55.0	11 40 22.17	336 32 16.8	26.5	31.6	26.3	25.30	. .	30.010	34
	18	γ Ursæ Majoris	58.9	17.0	35.0	53.0	11.2	29.2	47.1	11 44 53.06	15 38 39.9	41.7	48.8	47.1	44.38	. .	30.012	34
	19	α Cassiopeiæ, S. P.	59.3	17.0	36.0	55.0	14.0	33.0	51.1	12 30 55.06	85 13 48.6	60.0	57.0	54.0	52.40	. .	30.016	34.
	†20	Polaris, S. P.							38.0		52 34 56.9	55.0	68.3	63.0	60.80	. .	30.014	33.
	21							4.0			35 7.1	5.1	17.5	62.7	10.60	. .		
	22						51.0				14.1	13.5	25.0	20.0	18.15	. .		
	23					36.0				13 2 33.00	14.9	13.5	25.3	21.0	18.68	. .	30.014	33.
	24				15.0						13.6	12.5	23.2	19.0	17.22	. .		
	25			53.0							8.7	7.4	20.3	15.0	12.85	. .		
	†26		34.0								34 55.2	53.4	68.3	62.1	59.75	. .	30.016	35.
	27	η Ursæ Majoris	48.2	5.0	21.0	37.5	54.0	10.8	26.5	13 40 37.57	11 10 42.0	42.0	54.6	49.0	46.90	. .	30.014	32.
	28	α Bootis	14.2	25.5	36.2	47.5	59.1	10.2	21.5	14 7 47.74	341 5 30.1	38.5	46.0	41.2	38.95	. .	30.016	32.
	29	α² Libræ	59.0	10.0	21.0	31.3	42.5	53.8	4.2	14 41 31.69	305 43 36.4	45.0	56.5	51.8	47.42	. .	30.036	31.
	30	Libræ, 4923	5.0	16.2	27.3	38.1	50.0	1.4	12.1	14 47 38.59	300 24 51.4	62.2	72.0	67.0	63.15	. .	30.032	32.
	31	γ Draconis	19.0	35.8	53.0	9.3	26.8	43.8	0.1	17 52 9.69	12 36 22.0	23.8	33.3	27.5	26.65	. .	30.108	30.
	32	α Lyræ	11.0	24.1	38.0	51.3	5.1	18.8	31.6	18 30 51.41	359 44 44.7	51.5	59.1	52.2	51.88	. .	30.132	30.
25	†33	α Ursæ Majoris	13.1	36.2	58.3	21.2	45.0	8.0	30.0	10 53 21.69	23 40 31.1	25.2	26.0	28.5	27.70	. .	30.270	33.
	34	δ Leonis	30.2	42.0	53.0	4.3	15.5	27.2	38.3	11 5 4.36	342 28 21.4	24.7	22.0	24.0	23.02	. .	30.270	32.
	†35	β Leonis	49.0	0.0	10.8	21.3	32.8	44.0	54.2	11 40 21.73	336 32 27.5	20.7	28.8	30.7	26.92	. .	30.275	32.
	†36	γ Ursæ Majoris	58.0	16.0	34.3	52.4	11.0	29.2	46.2	11 44 52.44	15 38 52.9	45.9	47.1	50.4	49.08	. .	30.276	32.
	37	β Corvi	54.1	5.2	16.8	28.0	39.4	51.1	2.1	12 25 28.10	298 35 28.4	28.8	33.3	32.8	30.82	. .	30.284	25.
	38	Polaris, S. P.							32.0		52 34 64.4	57.0	62.7	63.0	61.78	. .	30.290	23.
	39							5.0			35 17.5	11.4	15.5	16.3	15.18	. .		
	40						50.0				25.5	18.8	24.1	24.5	23.22	. .		
	41									13 2 31.00	27.4	20.7	25.5	26.1	24.93	. .	30.290	24.
	42				14.0						27.0	19.8	23.5	24.0	23.58	. .		
	43			51.0							20.6	12.8	18.6	18.9	17.72	. .		
	44		34.0								35 8.5	1.0	7.4	6.9	5.95	. .	30.280	25.
	45	η Ursæ Majoris	48.2	4.1	21.0	37.2	53.3	10.2	26.0	13 40 37.14	11 10 57.1	52.1	53.0	56.1	54.58	. .		
	46	η Bootis	56.5	8.2	19.0	30.2	41.2	53.0	3.4	13 46 30.21	340 16 52.2	55.0	52.5	54.8	53.62	. .	30.288	23.
	47	ε Bootis	49.0	1.0	12.2	24.2	36.4	48.4	0.2	14 37 24.49	348 49 57.2	59.4	58.0	60.2	58.70	. .		
	48	α² Libræ	58.2	9.2	20.4	31.2	42.0	53.1	3.8	14 41 31.13	305 43 56.5	56.0	58.1	59.2	57.45	. .	30.308	22.
	49	β Ursæ Minoris	21.5	2.2	41.0	21.3	2.0	42.2	22.0	14 50 21.74	35 52 29.4	24.0	23.0	28.5	26.23	. .	30.316	22.
	†50	β Libræ	20.5	31.3	42.0	52.4	3.1	14.0	24.1	15 7 52.49	312 18 49.2	50.8	52.5	55.5	52.00	. .	30.318	22.
26	51	Sun 1st and N. L..	18.8	29.8	40.0	50.9	1.8	12.6	23.0	22 35 50.98	312 44 5.8	9.5	11.5	8.2	8.75	. .	30.045	28.
	52	Polaris	59.0								49 35 9.5	0.2	4.1	7.6	5.35	. .	30.041	31.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 10h.	0s.
	s.	s.	s.	s.	
Feb.23	+0.028	—0.242	—0.098	s 52.423	l .009
25	+0.028	—0.242	—0.098	s 52.881	l .011

4. Observed through clouds.
5. Obscured at last wire by clouds.
11. Too late for transit.
20 to 26. Very unsteady, and ill defined.
33. Observed for declination after passing last wire.
35. Observed through clouds; star unsteady.
36. High wind; star quite unsteady.
50. Cloudy.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.20	+ 1 24.44	54 30 45.54	60.44	+ 52.39	+ 0 35.41	18 21 40.88	+ 86 35 35.24	— 58.70	+15.62
0 0.21	1 28.22	46.35	. .						
+ 0 0.24	+ 1 33.18	45.42	. .						
— 0 0.42	— 2 25.46	292 19 58.40	. .	.40	0 0.05	6 52 36.32	— 28 46 22.79	+ 7.52	+ 3.57
0 0.33	0 17.99	343 21 47.36	. .	.40	+ 0 5.47	7 10 57.70	+ 22 15 26.17	12.07	—14.06
0 0.46	0 7.05	353 19 24.86	. .	.40	— 0 0.24	7 24 48.66	+ 32 13 3.67	12.84	20.80
— 0 0.52	0 39.53	326 43 1.65	. .	.40	0 0.09	7 31 16.52	+ 5 36 40.46	10.38	19.82
+ 0 0.02	— 0 11.18	329 29 43.95	. .	.40	0 12.16	7 35 55.74	+ 28 23 22.76	12.25	22.79
+ 0 0.15	+ 0 10.37	9 44 39.90	. .	.41	0 0.40	8 48 41.18	+ 48 38 18.71	13.50	45.02
— 0 0.44	— 1 4.42	313 6 22.19	59.19	.42	0 0.04	9 20 3.55	— 7 59 57.75	9.34	43.06
+ 0 0.27	0 15.58	345 34 53.74	. .	.42	0 29.11	9 37 7.96	+ 24 28 33.80	11.14	49.51
— 0 0.49	— 0 29.80	333 49 6.04	. .	.42	0 0.13	10 0 12.38	+ 12 42 46.10	10.34	52.33
0 0.46	+ 0 26.54	23 40 53.30	. .	.43	0 0.65	10 54 13.88	+ 62 34 33.36	11.74	61.45
0 0.41	— 0 19.11	342 28 1.18	. .	.43	0 0.17	11 5 57.06	+ 21 21 41.24	10.42	60.85
— 0 0.49	— 1 19.66	307 9 17.78	. .	.43	— 0 0.01	11 11 41.23	— 13 57 2.16	9.42	—62.53
+ 0 0.13	+ 2 5.34	64 19 41.22	. .	.44	+ 0 1.89	11 33 1.12	+ 76 46 38.72	11.93	+66.99
0 0.19	— 0 26.33	336 31 59.16	. .	.44	— 0 0.14	11 41 14.47	+ 15 25 39.22	9.95	—62.88
0 0.08	+ 0 17.00	15 39 1.46	. .	.44	— 0 0.48	11 45 45.02	+ 54 32 41.52	10.15	—61.46
0 0.35	10 46.65	85 24 39.40	. .	.45	+ 0 0.55	12 31 48.06	+ 55 41 42.16	13.29	+67.66
0 0.31	1 40.46	52 36 41.57	. .						
0 0.25	1 29.26	40.11	. .						
0 0.21	1 22.05	40.41	. .						
0 0.21	1 19.59	38.48	. .	.45	+ 0 12.96	13 3 38.41	+ 88 29 39.75	81.76	+58.58
0 0.21	1 21.76	39.19	. .						
0 0.24	1 28.47	41.56	. .						
0 0.31	1 39.94	40.00	. .						
0 0.38	+ 0 12.07	11 10 59.28	. .	.46	— 0 0.42	13 41 29.61	+ 50 4 39.34	7.83	—52.09
0 0.12	— 0 20.93	341 5 18.14	. .	.46	0 0.16	14 8 40.04	+ 19 58 58.20	9.27	59.80
+ 0 0.37	1 24.92	305 42 22.87	. .	.47	— 0 0.01	14 42 24.15	— 15 23 57.07	11.32	56.88
— 0 0.32	— 1 43.86	300 23 18.97	58.91	.47	+ 0 0.01	14 48 31.07	— 20 43 0.69	11.68	—57.45
— 0 0.13	+ 0 13.72	12 36 40.24	. .	.50	— 0 0.43	17 53 1.76	+ 51 30 20.58	5.89	+ 9.17
+ 0 0.05	— 0 0.25	359 44 51.68	. .	.50	0 0.29	18 31 43.62	+ 38 38 32.02	8.20	+20.11
— 0 0.31	+ 0 27.33	23 40 54.72	61.22	.90	0 0.65	10 54 13.94	+ 62 34 32.75	11.72	—61.95
— 0 0.30	— 0 19.74	342 28 2.98	. .	.90	0 0.17	11 5 57.09	+ 21 21 41.01	10.40	60.92
+ 0 0.13	— 0 27.15	336 31 59.90	. .	.90	0 0.14	11 41 14.49	— 15 25 37.93	9.92	62.88
0 0.03	+ 0 17.55	15 39 6.66	65.57	.91	— 0 0.48	11 45 44.87	+ 54 32 40.34	10.11	61.86
0 0.11	— 1 54.96	298 33 35.97	. .	.91	+ 0 0.02	12 26 21.03	— 22 33 50.35	9.93	—69.64
0 0.22	+ 1 43.30	52 36 45.30	. .						
0 0.16	1 31.92	47.26	. .						
0 0.13	1 24.77	48.12	. .						
0 0.13	1 22.33	47.39	. .	.91	+ 0 12.33	13 3 36.24	+ 88 29 38.58	82.76	+58.93
0 0.13	1 24.51	48.22	. .						
0 0.15	1 31.25	49.12	. .						
0 0.20	1 42.64	48.79	. .						
0 0.24	+ 0 12.48	11 11 7.30	. .	.92	— 0 0.42	13 41 29.64	+ 50 4 40.98	7.76	—52.31
0 0.24	— 0 22.65	340 16 31.21	. .	.92	0 0.16	13 47 22.97	+ 19 10 5.89	9.59	56.83
0 0.22	0 12.53	348 49 46.39	. .	.93	0 0.23	14 38 17.19	+ 27 43 20.07	9.00	45.33
+ 0 0.22	— 1 28.09	305 42 29.55	. .	.93	0 0.01	14 42 24.05	— 15 23 56.77	+ 11.26	56.62
— 0 0.31	+ 0 45.95	35 53 11.97	. .	.93	0 1.23	14 51 13.44	+ 74 46 45.65	— 1.67	38.91
— 0 0.18	— 1 9.75	312 17 42.04	. .	.93	0 0.03	15 8 45.39	— 8 48 44.28	+ 11.14	—49.29
+ 0 0.29	—17 10.64	312 26 58.11	63.80	.85	— 0 0.03	22 37 49.28	— 8 39 26.44	. .	. .
+ 0 0.30	+ 0 51.00	49 35 56.65	. .						

NADIR POINTS. A.	B.	C.	D.	Means
	Feb.23	8h.		° ′
				179 59
59″2	59″0	63″3	59″4	60″22
59.6	59.1	64.3	59.8	60.70
59.5	59.3	64.2	59.9	60.72
58.5	58.8	63.4	59.1	59.95
59.5	59.2	64.3	59.5	60.62
59.26	59.08	63.90	59.54	60.44
	Feb.23	14h.		179 59
51.5	60.3	63.1	60.6	58.87
51.8	60.8	64.1	61.8	59.62
51.1	61.0	64.1	60.7	59.22
51.3	60.8	63.5	61.1	59.17
51.5	60.5	63.6	60.6	59.05
51.44	60.68	63.68	60.96	59.19
	Feb.23	18h.		179 59
50.5	60.5	64.2	60.0	58.08
50.8	61.0	63.2	60.4	58.85
50.4	60.3	63.3	60.0	58.50
51.5	60.7	64.0	61.0	59.30
51.0	60.9	63.8	60.8	59.12
50.84	60.68	63.70	60.44	58.91
	Feb.25	10h.		179 59
60.6	62.8	60.3	60.5	61.05
61.3	63.3	61.0	60.8	61.60
61.3	62.8	60.6	60.3	61.25
60.5	62.7	60.5	60.6	61.07
60.8	62.8	60.5	60.3	61.10
60.90	62.88	60.58	60.50	61.21
	Feb.25	16h.		179 59
65.9	67.4	64.6	63.6	65.37
65.0	66.5	65.5	63.8	65.20
66.0	67.7	65.4	64.5	65.90
65.3	67.5	65.8	64.5	65.77
65.2	67.2	65.2	64.8	65.60
65.48	67.26	65.30	64.24	65.57

o.	Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
		m. s.	′ ″
1	Sun .	+ 1 5.48	

Feb. 23. Error of Runs +0″93.
" 25. do. do. +0.66.

Feb. 23, 14*h*. Considerable change in Microscope A; by comparison of readings, it appears to have occurred between the observations of *ι* Ursæ Majoris and *α* Hydræ.

Feb. 25, 16*h*. Nadir Point at this time differs greatly from that at 10*h*; the change appears to have taken place between the observations of *β* Leonis and *γ* Ursæ Majoris.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.
Mar. 9	1	15 Argus	..	41.0	53.2	5.0	16.5	28.3	39.5	8 0 10.58	297 16 7.8	4.5	10.6	6.0	7.22	. .	
	2	λ Ursæ Minoris, S. P. .	..	..	..	12.5	..	..	..	8 14 12.50	52 14 18.8	11.2	12.8	14.5	14.32	. .	30.16
	3	Hydræ, 2889 . . .	..	23.4	34.5	45.2	56.3	6.8	17.0	8 26 50.53	328 16 57.8	59.2	60.2	58.0	58.80	. .	
	4	ι Ursæ Majoris . . .	..	12.0	29.4	44.8	1.4	17.7	33.1	8 47 53.06	9 44 39.2	33.9	39.5	34.3	36.72	. .	30.16
	†5	Moon, 1st and N. L. .	..	14.8	26.3	37.2	48.9	59.8	10.2	9 5 42.87	332 10 2.5	4.5	7.6	4.6	4.80	. .	
	†6	α Hydræ	..	45.0	57.0	7.2	17.5	28.9	39.0	9 19 12.43	313 7 29.8	29.8	34.8	32.6	31.75	. .	
	7	ε Leonis	..	48.5	1.0	12.4	24.2	35.6	47.1	9 36 18.13	345 35 16.8	18.1	21.1	18.1	18.52	. .	30.16
	†8	α Leonis	..	54.0	5.2	15.9	27.2	38.2	48.9	9 59 21.57	333 49 45.2	45.8	47.0	45.4	45.85	. .	
12	9	Sun, 1st and N. L. .	15.2	25.0	36.0	47.0	57.7	8.0	18.2	23 28 46.73	318 7 23.8	19.6	23.9	18.4	21.42	. .	30.19
	10	Polaris	52.0								49 34 71.4	59.0	64.5	70.1	66.25	. .	30.16
	†11			..							60.0	47.5	55.2	57.5	55.05	. .	
	12				1.0					0 57 53.00	52.6	39.8	49.3	52.2	48.47	. .	30.16
	13					59.0					49.0	35.5	43.8	47.7	44.00	. .	
	14						40.0				53.0	39.3	48.5	51.9	48.18	. .	
17	15	α Canis Majoris . . .	51.8	1.5	13.4	24.5	36.0	46.5	57.5	6 37 24.46	. . . .	..	..	..	. .	. .	30.05
	16	Anonymous, S. P. .	45.0	5.6	26.6	48.4	9.8	32.4	51.0	7 37 48.40	. . . .	..	..	..	. .	. .	30.05
	17	ε Hydræ	9.0	18.4	29.8	40.5	51.4	2.1	22.2	8 37 40.49	. . . .	..	..	..	. .	. .	30.05
	18	α Leonis	41.7	51.3	2.5	13.8	24.9	35.5	46.0	9 59 13.67	. . . .	..	..	..	. .	. .	30.05
	19	δ Leonis	25.0	35.0	47.5	58.5	11.0	21.5	32.5	11 4 58.71	. . . .	..	..	..	. .	. .	30.10
	20	γ Ursæ Majoris . . .	..	9.2	28.4	47.0	5.7	23.8	..	11 44 46.82	. . . .	..	..	..	. .	. .	30.10
	21	β Corvi	48.5	58.5	11.0	22.5	34.0	45.5	56.6	12 25 22.37	. . . .	..	..	..	. .	. .	30.12
	22	Moon, 2d and S. L. .	..	15.0	27.5	39.0	50.5	2.3	..	15 51 38.86	. . . .	..	..	..	. .	. .	30.12
	23	Polaris	48.0								. . . .	..	..	..	. .	. .	
	24			48.0							. . . .	..	..	..	. .	. .	
	25				53.0						. . . .	..	..	..	. .	. .	
18	†26					43.0				1 2 39.71	. . . .	..	..	..	. .	. .	
	27						32.0				. . . .	..	..	..	. .	. .	
	28							15.0			. . . .	..	..	..	. .	. .	
	29								39.0		. . . .	..	..	..	. .	. .	
29	30	Venus, 2d and N. L. .	28.5	39.8	50.6	1.3	12.5	23.2	35.0	22 19 1.56	315 56 19.8	14.0	22.6	18.8	18.80	. .	30.24
30	31	Sun, 1st and N. L. .	42.8	54.0	5.0	15.8	26.2	38.0	49.0	0 33 15.83	325 11 50.4	44.2	53.3	48.7	49.15	. .	30.24
	†32	Polaris	30.0	38.5	33.0	24.0	19.0	20.0	16.0	1 2 25.79	. . . .	..	..	..	. .	. .	
	33	ε Leonis	30.0	42.0	54.1	6.2	18.0	30.5	42.2	9 36 6.14	345 34 64.0	53.9	62.9	61.0	60.45	. .	30.24
	34	α Leonis	35.3	46.8	58.0	9.0	20.2	32.2	43.8	9 59 9.33	333 49 29.6	25.2	31.3	28.8	28.72*d*	. .	30.25
	35	α Ursæ Majoris . . .	0.2	24.0	47.8	12.0	35.2	59.2	23.1	10 53 11.64	23 40 35.9	19.4	30.7	28.9	28.73*d*	. .	30.26
	36	δ Leonis	19.5	31.2	43.0	55.0	6.2	18.2	30.2	11 4 54.77	342 28 15.2	9.8	17.0	14.4	14.10	. .	30.26
	37	δ Hydræ et Crateris. .	5.0	16.3	27.7	38.7	50.0	1.3	12.6	11 10 38.80	307 10 25.0	17.2	27.7	24.6	23.62*d*	. .	30.26
	38	γ Cephei, S. P. . . .	36.1	24.0	12.0	59.5	47.2	35.3	24.2	11 31 59.76	64 17 46.4	27.5	44.0	38.6	39.12	. .	30.25
	39	β Leonis	38.2	49.8	1.0	12.3	23.8	35.4	47.2	11 40 12.50	336 32 22.6	17.8	23.8	19.5	20.92	. .	
	40	γ Ursæ Majoris . . .	46.5	5.3	24.4	43.2	1.8	21.0	40.0	11 44 43.17	15 38 50.6	36.9	47.9	44.3	44.92	. .	30.25
	41	β Corvi	43.0	55.2	7.0	19.2	30.8	43.0	54.3	12 25 18.93	298 35 8.7	0.5	10.5	6.0	6.42	. .	30.25
	42	Polaris, S. P. . .							36.0		52 34 70.1	51.8	66.7	61.7	62.57	. .	30.25
	43							30.0			35 22.0	5.2	18.8	16.1	15.52	. .	
	44						31.0				29.6	12.6	25.0	22.2	22.35	. .	
	45					21.0				13 2 24.43	29.4	12.8	25.2	23.0	22.60	. .	30.24
	46				23.0						25.3	8.0	22.5	19.4	18.80	. .	
	47			13.0							20.5	2.8	17.2	13.2	13.42	. .	
	48		17.0								34 66.5	49.0	63.0	59.5	59.50	. .	30.25
	49	Polaris	37.0								49 34 65.9	47.4	58.7	58.6	57.65	. .	30.43
	50			39.0							53.5	35.0	46.3	46.1	45.22	. .	
	51				29.0						45.0	27.5	39.1	38.2	37.45	. .	
Apr. 1	52					28.0				1 2 27.71	46.1	27.8	40.4	39.0	38.32	. .	30.43

DATE.	VALUE OF m.	n.	c.	CLOCK. At 9*h*.	H. Rate. 0*s*.
	s.	s.	s.	s.	
Mar. 9.	+0.016	−0.117	−0.098	*s* 56.450	*l* .012
17	0.183	0.130	−0.076	58.635	.010
30	+0.521	−0.342	+0.246	*s* 61.558	*l* .010

* M. Lieutenant L. Maynard.
5. Tremulous and faint, clouds passing.
6. Tremulous and badly defined.
8. Star very tremulous; light clouds passing.
11. Observed for dec. at 48*m*. 52*s*.
26. Wind high and star very unsteady.
32. Too faint to be observed on horizontal wire also.

RRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
0.15	— 1 56.21	297 14 10.86	63.79	+ 56.44	— 0 5.89	8 1 1.13	— 23 52 13.68	+ 8.14	—17.25
0.10	+ 1 17.54	52 15 31.76	. .	.44	. . .	. . . .	+ 88 50 52.78	. .	+47.63
0.13	— 0 57.19	328 16 1.74	. .	.44	0 5.41	8 27 41.56	+ 7 9 37.10	10.56	—31.52
0.05	+ 0 10.57	9 44 47.14	. .	.45	0 8.22	8 48 41.29	+ 48 38 22.60	13.65	47.47
0.14	+ 9 48.87	332 19 53.58	. .	.45	0 5.47	9 7 36.04	+ 11 13 28.99	. .	. .
0.19	— 1 4.48	313 6 27.06	. .	.46	0 5.38	9 20 3.51	— 7 59 57.46	9.40	41.50
0.09	0 15.56	345 35 3.05	. .	.46	0 5.93	9 37 8.66	+ 24 28 38.51	11.17	50.53
0.16	0 29.77	333 49 16.24	. .	.47	— 0 5.45	10 0 12.59	+ 12 42 51.70	10.33	—52.40
0.04	—16 52.17	317 50 29.25	55.36	. .	. . .	. . . .	— 3 15 46.90	. .	. .
0.24	+ 0 46.81	49 35 52.82	. .						
0.29	0 57.24	52.00	. .						
0.32	1 4.83	52.98	. .	. .	. . .	. . .	+ 88 29 36.07	89.28	+63.01
0.34	1 7.07	50.73	. .						
0.32	+ 1 4.53	52.39	. .						
. . .	. . .	. . . .	. .	58.61	+ 0 0.13	6 38 23.20	. . . .	9.12	2.86
. . .	. . .	. . . .	. .	.62	0 0.42	7 38 47.44	. . . .	4.57	+41.05
. . .	. . .	. . . .	. .	.63	0 0.10	8 38 39.22	. . . .	10.56	—34.33
. . .	. . .	. . . .	. .	.64	0 0.08	10 0 12.39	. . . .	10.37	52.60
. . .	. . .	. . . .	. .	.65	+ 0 0.05	11 5 57.41	. . . .	10.30	62.24
. . .	. . .	. . . .	. .	.66	— 0 0.18	11 45 45.30	. . . .	9.88	66.50
. . .	. . .	. . . .	. .	.67	+ 0 0.16	12 26 21.20	. . . .	9.64	—65.80
. . .	. . .	. . . .	. .	.70	+ 0 0.14	15 51 29.78	. . . .	. .	. .
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.79	— 0 7.48	1 3 31.02	. . . .	90.72	+64.95
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
0.15	— 1 3.82	315 55 14.06	49.42	61.45	+ 0 0.80	22 20 2.35	— 5 10 55.34	. .	. .
0.04	16 37.45	324 55 11.77	. .	.47	+ 0 0.75	0 35 22.28	+ 3 49 1.57	. .	. .
. . .	. . .	. . . .	. .	.48	— 0 3.12	1 3 24.15	. . . .	92.53	. .
0.23	0 15.43	345 34 45.36	48.57	.56	+ 0 0.64	9 37 8.34	+ 24 28 35.93	11.37	—52.37
0.00	— 0 29.55	333 48 59.17	. .	.57	0 0.70	10 0 12.20	+ 12 42 49.85	10.48	53.14
0.00	+ 0 26.52	23 40 55.24	. .	.58	0 0.40	10 54 13.62	+ 62 34 45.92	11.82	70.63
0.28	— 0 19.10	342 27 55.28	. .	.58	0 0.65	11 5 57.00	+ 21 21 45.96	10.33	63.48
0.03	— 1 19.58	307 9 4.07	. .	.58	0 0.86	11 11 41.24	— 13 57 5.25	9.33	—57.86
0.11	+ 2 4.93	64 19 44.13	. .	.58	0 0.90	11 33 3.34	+ 76 46 25.19	11.75	+78.11
0.23	— 0 26.21	336 31 54.87	. .	.59	0 0.68	11 41 14.77	+ 15 25 45.55	9.74	—64.34
0.08	+ 0 16.92	15 39 1.90	. .	.59	0 0.47	11 45 45.23	+ 54 32 52.58	9.89	69.82
0.31	— 1 50.58	298 33 16.05	. .	.59	0 0.93	12 26 21.45	— 22 32 53.27	9.56	—63.74
0.33	+ 1 41.40	52 36 44.30	. .						
0.25	1 28.75	44.52	. .						
0.21	1 20.58	44.14	. .						
0.21	1 19.00	41.81	. .	.60	+ 0 4.16	13 3 30.19	+ 88 29 26.50	92.50	+68.68
0.22	1 21.58	40.66	. .						
0.27	1 29.19	42.88	. .						
0.35	1 41.61	41.46	. .						
0.24	0 46.37	49 35 43.78	. .						
0.27	0 58.94	43.87	. .						
0.35	1 6.51	43.61	. .						
0.35	+ 1 9.00	46.97	55.28	+ 62.00	— 0 3.12	1 3 26.59	+ 88 29 28.98	+ 92.43	+69.27

NADIR POINTS.				
A.	B.	C.	D.	Means
	Mar.9,	Noon.		° ′
				179 59
65″8	67″3	66″8	63″4	65″57
63.8	65.7	65.5	61.6	64.15
63.4	65.2	65.2	62.1	63.98
63.8	65.1	64.5	61.8	63.80
65.0	68.2	67.0	62.8	65.75
64.9	65.6	65.3	62.1	64.47
66.2	66.2	66.1	64.0	65.63
65.1	67.5	65.9	63.0	65.37
65.8	67.5	66.3	63.1	65.68
65.8	67.5	66.3	63.1	65.67
64.96	66.58	65.89	62.60	65.01
	Mar.9,	Night.		179 59
64.5	65.4	64.2	62.8	64.22
64.0	64.8	65.1	61.4	63.83
64.8	65.6	65.6	63.2	64.80
64.8	63.5	62.5	61.0	62.95
64.8	64.9	64.0	62.3	64.00
64.8	64.9	64.0	60.0	63.42
64.8	64.9	64.0	61.1	63.70
63.6	64.9	64.0	61.1	63.40
63.6	64.1	64.0	61.1	63.20
64.5	65.5	65.6	62.2	64.45
64.42	64.85	64.30	61.62	63.79
	Mar.	12, 0*h*.		179 59
59.8	54.5	55.6	52.5	55.60
59.4	54.5	55.5	52.1	55.37
59.2	54.0	55.3	52.0	55.13
59.46	54.33	55.46	52.20	55.36
	Mar.	17,Mid	night.	179 59
62.3	62.6	66.4	63.2	63.62
61.5	60.6	63.8	62.0	61.97
60.8	60.0	61.0	60.0	60.45
58.8	59.0	59.0	58.2	58.75
60.7	60.0	60.5	60.5	60.42
58.8	59.3	58.8	58.7	58.90
59.2	59.0	60.2	59.5	59.47
61.5	61.0	60.9	60.0	60.85
60.3	60.0	61.8	60.0	60.52
62.5	62.5	62.0	61.5	62.12
60.64	60.40	61.44	60.36	60.71
	Mar.	18.		179 59
63.3	62.3	63.8	62.5	62.97
63.2	62.7	63.8	62.4	63.02
63.8	62.9	64.4	63.4	63.62
63.0	62.0	64.0	61.6	62.65
61.2	60.3	61.0	60.3	60.70
62.90	62.04	63.40	62.04	62.59
	Mar.	30, 2*h*.		179 59
55.0	47.6	43.6	50.3	49.12
55.1	47.8	44.0	51.0	49.47
55.3	47.8	44.9	50.6	49.65
55.13	47.73	44.16	50.63	49.41
	Mar.	30,	10*h*.	179 50
52.5	45.3	50.5	46.5	48.70
52.2	45.0	50.4	46.8	48.60
52.0	44.8	50.8	46.9	48.62
51.8	44.9	51.0	46.3	48.50
51.6	43.5	51.8	46.8	48.42
52.02	44.07	50.9	46.66	48.57

bject.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
oon .	+ 1 2.19	
oon .	— 1 7.92	
enus .	— 0 1.46	
n . .	+ 1 4.23	

Mar. 9. Error of Runs, +0″39.
" 12. do. do. —0.80.
" 17. do. do. +0.52.
" 18 do. do. —0.37.
" 30. do. do. +0.69.
Mar. 28. A new set of wires put in, consisting of 11 vertical and 7 horizontal moveable wires.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS At.	Ex
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°
Apr. 1	1	Polaris					22.0				49 34 48.0	30.2	43.1	41.2	40.62	. .			
	2							24.0			54.8	35.8	50.0	49.0	47.40	. .			
	3								15.0		65.4	46.8	59.5	59.0	57.67	. .	30.428	49.5	53.
	4	15 Argus	22.0	34.1	46.0	58.0	9.9	22.0	34.0	7 59 58.00	297 15 55.8	54.3	60.0	58.8	57.22	. .	30.380	50.0	46.
	5	ε Hydræ	3.1	14.2	25.2	36.2	47.1	58.1	9.3	8 37 36.17	328 5 26.2	27.6	32.5	30.2	29.12	. .	30.392	49.7	43.
	6	ι Ursæ Majoris, (ref.) .	49.0	4.5	21.0	37.5	54.0	10.8	27.5	8 47 38.61	170 15 23.1	23.9	24.0	25.7	24.18	. .	30.386	49.5	43.
	7	α Hydræ	27.2	38.2	49.8	0.5	11.8	23.0	34.0	9 19 0.64	313 7 19.1	21.3	26.0	26.1	23.12	. .	30.392	48.5	42.
	8	ε Leonis, (ref.) . . .	29.8	42.0	54.1	6.0	18.2	30.2	42.2	9 36 6.07	194 24 43.1	42.8	46.4	41.5	43.45	. .	30.394	48.3	41.
	9	α Leonis	36.0	47.3	58.5	9.5	20.8	32.0	43.4	9 59 9.64	333 49 32.3	34.3	35.5	37.0	34.78	. .	30.390	47.5	40.
	10	α Ursæ Majoris . . .	..	24.0	47.5	11.5	35.0	58.8	22.3	10 53 23.18	23 40 38.3	27.6	34.5	34.7	33.78	. .	30.380	46.0	39.
2	†11	ε Leonis	29.0	41.5	53.6	5.9	17.6	29.7	41.5	9 36 5.54	. . . .	..	..	..	. .	. .			
	12	α Leonis	35.7	47.1	58.2	9.4	20.4	31.9	43.0	9 59 9.39	. . . .	..	..	..	. .	. .			
	13	δ Leonis	19.3	31.0	42.3	54.2	6.1	18.0	29.6	11 4 54.36	. . . .	..	..	..	. .	. .			
	14	β Leonis	37.7	49.1	0.5	11.6	23.0	34.5	45.7	11 40 11.73	. . . .	..	..	..	. .	. .			
	15	β Corvi	42.8	54.9	6.5	18.5	30.1	42.0	53.8	12 25 18.37	. . . .	..	..	..	. .	. .			
	16								34.5		. . . .	..	..	..	. .	. .			
	17							29.0			. . . .	..	..	..	. .	. .			
	18						28.0				. . . .	..	..	..	. .	. .			
	19	Polaris, S. P. . .				18.0				13 2 21.57	. . . .	..	..	..	. .	. .			
	20				18.0						. . . .	..	..	..	. .	. .			
	21			19.0							. . . .	..	..	..	. .	. .			
	†22		14.5								. . . .	..	..	..	. .	. .			
	23	α Bootis	3.0	14.7	26.2	37.7	49.5	1.0	12.8	14 7 37.84	. . . .	..	..	..	. .	. .			
	24	Venus, 2d and N. L. .	23.2	34.5	45.2	56.0	7.2	18.0	29.2	22 24 56.19	315 40 42.0	45.8	48.0	45.4	45.30	. .	30.428	45.8	49.
	25		35.0								49 34 62.0	54.0	57.0	59.6	58.15	. .			
	26			41.0							49.1	42.0	45.3	46.2	45.65	. .			
	27				33.0						42.2	34.8	37.3	40.3	38.65	. .			
3	28	Polaris				31.0				1 2 28.71	39.3	31.6	37.0	34.6	35.62	. .			
	29						22.0				42.2	34.0	38.1	39.2	38.38	. .			
	30							21.0			50.3	42.6	46.5	58.1	46.88	. .			
	31								18.0		63.9	56.3	58.1	61.3	59.90	. .			
	32	Mercury, 1st and S. L.	43.0	54.3	5.2	17.0	28.1	40.0	51.1	1 53 16.96	336 1 16.8	22.9	20.0	19.0	19.67	. .	30.414	51.6	55.
	†33	Jupiter	53.8	..	16.0	..	39.0	..	1.5	2 46 27.58	336 23 7.0	12.3	10.5	10.4	10.05	. .	30.396	52.5	56.
	†34		..	7.2	..	30.0	..	52.8	..	2 46 30.00									
	35	β Geminorum . . .	14.3	27.0	39.1	52.0	4.1	16.6	29.2	7 34 51.76	349 29 55.5	59.2	57.3	58.9	57.72	. .	30.388	52.7	48.
	36	15 Argus	21.5	33.5	45.5	57.4	9.2	21.3	33.4	7 59 57.40	297 15 56.2	59.0	62.4	59.9	59.38	. .	30.390	52.0	47.
	37	ε Hydræ	2.8	14.0	25.0	36.0	46.8	57.9	9.0	8 37 35.93	328 5 23.8	28.0	32.0	28.2	28.00	. .	30.408	51.5	46.
	38	ι Ursæ Majoris . . .	48.0	4.4	21.0	37.2	54.2	10.8	27.2	8 47 37.54	9 44 36.2	34.3	37.2	39.0	36.82	. .	30.410	51.0	46.
	39	α Hydræ	27.0	38.0	49.2	0.3	11.0	22.1	33.3	9 19 0.13	313 7 20.0	26.0	28.1	28.0	25.52	. .	30.416	51.0	44.
	†40	ε Leonis	..	..	..	..	..	..	..	. . . .	345 35 12.6	14.4	15.8	16.3	14.77	. .	30.420	50.8	45.
	†41	γ Ursæ Majoris . . .	45.2	4.0	22.3	42.2	1.2	20.0	39.0	11 44 41.99	15 38 63.0	59.8	61.1	61.9	61.45	. .	30.440	46.1	42.
	42	β Corvi	42.2	54.1	6.0	18.0	30.0	42.0	53.6	12 25 17.99	298 35 12.8	14.6	17.8	16.3	15.38	. .	30.442	45.0	41.
	43	12 Canum Venat. . . .	6.0	20.5	34.0	48.2	2.8	16.4	31.0	12 47 48.41	0 15 10.1	11.2	10.3	13.0	11.15	. .			
	44						28.0				52 35 36.1	29.0	36.5	35.8	34.35	. .	30.454	44.6	40.
	45	Polaris, S. P. . .				21.0				13 2 22.33	39.3	31.6	39.0	38.2	37.02	. .			
	46				18.0						36.9	29.1	37.0	36.0	34.75	. .	30.452	44.8	40.
	47	α Virginis	32.2	42.7	53.5	4.8	16.0	27.0	38.2	13 16 4.91	310 45 53.5	57.5	60.0	59.6	57.65	. .	30.454	44.6	40.
	48	β Ursæ Minoris . . .	8.0	50.1	31.5	13.2	54.7	36.5	18.5	14 50 13.21	35 52 32.3	26.5	31.4	31.8	30.50*d*	. .	30.474	43.5	38.
	49	α Serpentis	7.0	18.2	29.2	40.8	52.2	3.0	13.3	15 35 40.53	328 1 37.0	43.2	44.8	40.0	41.25	. .	30.474	42.0	34.
	†50	ζ Ursæ Minoris . . .	59.0	54.0	47.0	41.0	35.0	29.3	22.3	15 48 41.09	39 21 11.2	7.5	10.0	11.0	9.92	. .	30.468	42.0	32.9
	†51	β^1 Scorpii	54.0	5.8	17.2	28.2	40.2	52.1	3.3	15 55 28.69	301 45 8.4	11.6	15.2	14.2	12.35	. .	30.460	41.2	32.3
	52	δ Ophiuchi	43.0	53.2	4.0	15.0	26.0	38.0	48.8	16 5 15.43	317 49 29.3	33.4	37.3	35.2	33.86*d*	. .	30.454	40.5	31.8

DATE.	VALUE OF *m.*	*n.*	*c.*	CLOCK. At 9*h*.	H. Rate. 0*s*.
	s.	s.	s.	s.	
Apr. 1	+0.521	—0.342	+0.246	*s* 62.077	*l* .009
2	.521	.342	.246	62.164	.008
3	+0.521	—0.342	+0.246	*s* 62.467	*l* .008

11 to 22. Very unsteady.
33, 34. Planet quite faint.
40. Too late for transit.
41. This and the following observations are taken upon the micrometer wire at 40*r*.00.
50, 51 Unsteady.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	M. s.	H. M. s.	° ′ ″	s.	″
− 0 0.30	+ 1 6.53	49 35 46.85	55.28	+ 62.00					
0 0.27	0 58.86	45.97	. .						
0 0.24	+ 0 46.56	43.99	. .						
− 0 0.22	− 1 54.74	297 14 2.26	57.04	.07	+ 0 0.94	8 1 1.01	− 23 52 15.53	+ 8.55	−15.17
+ 0 0.11	0 37.19	328 4 52.04	. .	.07	+ 0 0.73	8 38 38.97	+ 6 58 34.25	10.77	34.45
− 0 0.09	0 10.26	170 15 13.81	. .	.08	− 0 0.04	8 48 40.65	+ 48 38 22.51	14.11	50.89
0 0.30	− 1 3.87	313 6 18.95	. .	.08	+ 0 0.82	9 20 3.54	− 7 59 58.84	9.64	40.00
0 0.16	+ 0 15.44	194 24 58.73	. .	.08	0 0.23	9 37 8.38	+ 24 28 37.56	11.39	52.55
0 0.36	− 0 29.53	333 49 4.89	. .	.09	+ 0 0.70	10 0 12.43	+ 12 42 47.10	10.49	53.23
− 0 0.36	+ 0 26.39	23 40 59.81	. .	.09	− 0 11.51	10 54 13.76	+ 62 34 42.02	11.86	−71.15
. . .	. . .	. . . .	. .	.17	+ 0 0.64	9 37 8.35	. . . .	11.41	. .
. . .	. . .	. . . .	. .	.17	0 0.70	10 0 12.26	. . . .	10.50	. .
. . .	. . .	. . . .	. .	.18	0 0.65	11 5 57.19	. . . .	10.35	. .
. . .	. . .	. . . .	. .	.19	0 0.68	11 41 14.60	. . . .	9.75	. .
. . .	. . .	. . . .	. .	.19	0 0.93	12 26 21.49	. . . .	9.59	. .
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.20	0 4.16	13 3 27.93	. . . .	92.40	+69.70
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.21	0 0.66	14 8 40.71	. . . .	8.53	. .
+ 0 0.12	− 1 3.45	315 39 41.85	59.25	.37	+ 0 0.80	22 25 58.00	− 5 26 38.03	. .	. .
0 0.31	+ 0 45.96	49 35 44.42	. .						
0 0.38	0 58.89	44.92	. .						
0 0.40	1 6.23	45.28	. .						
0 0.42	1 8.65	44.69	. .	.40	− 0 3.12	1 3 27.99	+ 88 29 25.21	92.39	+69.84
0 0.40	1 6.16	44.94	. .						
0 0.38	0 58.61	45.87	. .						
+ 0 0.30	+ 0 46.16	46.36	. .						
− 0 0.40	− 0 17.68	336 1 1.59	. .	.41	+ 0 0.68	1 54 20.33	+ 14 54 41.38	. .	. .
+ 0 0.25	0 41.91	336 22 28.39	. .	.42	0 0.68	2 47 31.89	+ 15 16 8.39	. .	. .
+ 0 0.01	0 10.97	349 29 46.96	59.37	.46	0 0.62	7 35 54.84	+ 28 23 26.84	12.92	−24.83
− 0 0.10	1 54.56	297 14 4.72	. .	.46	0 0.94	8 0 0.80	− 23 52 15.40	8.59	15.08
+ 0 0.06	− 0 36.99	328 4 51.07	. .	.47	0 0.73	8 38 39.13	+ 6 58 30.95	10.80	34.49
+ 0 0.04	+ 0 10.21	9 44 47.07	. .	.47	0 0.50	8 48 40.51	+ 48 38 26.95	14.16	51.13
− 0 0.14	− 1 3.66	313 6 21.72	. .	.47	0 0.82	9 20 3.42	− 7 59 58.40	9.66	39.94
+ 0 0.07	− 0 15.31	345 34 59.53	61.50	. .	. . .	. . . .	+ 24 28 37.28	. .	52.73
0 0.00	+ 0 16.82	15 39 18.27	. .	.49	0 0.47	11 44 44.95	+ 54 32 56.00	9.91	70.85
+ 0 0.07	− 1 50.04	298 33 25.41	. .	.50	0 0.93	12 26 21.42	− 22 32 56.84	9.55	63.19
− 0 0.02	+ 0 0.33	0 15 11.46	. .	.50	0 0.56	12 48 51.47	+ 39 8 49.21	8.72	−65.14
+ 0 0.04	1 21.07	52 36 55.56	. .						
0 0.04	1 18.11	55.17	. .	.50	0 6.59	13 3 31.42	+ 88 29 26.67	92.40	+70.00
+ 0 0.04	+ 1 21.21	56.00	. .						
− 0 0.10	− 1 9.88	310 44 47.67	. .	.50	0 0.83	13 17 8.24	− 10 21 34.58	9.79	−61.81
0 0.00	+ 0 43.80	35 53 14.30	. .	.51	0 0.20	14 51 15.92	+ 74 46 52.05	4.02	46.40
0 0.16	− 0 38.14	328 1 2.95	. .	.52	0 0.73	15 36 43.78	+ 6 54 40.70	9.49	37.51
0 0.02	+ 0 50.18	39 22 0.08	. .	.52	0 0.08	15 49 43.69	+ 78 15 38.83	11.68	29.98
− 0 0.02	− 1 38.78	301 43 33.55	. .	.52	0 0.90	15 56 32.11	− 19 22 48.70	11.26	39.19
0 0.00	− 0 55.53	317 48 38.33	. .	.52	+ 0 0.79	16 6 18.74	− 3 17 43.92	+ 10.22	−33.03

NADIR POINTS.				
A.	B.	C.	D.	Means
				° ′
	Apr. 1,	2h.		179 59
58″5	51″6	57″0	54″4	55″37
58.6	51.4	57.4	54.0	55.35
58.3	51.5	57.0	54.5	55.32
58.2	51.3	56.5	54.5	55.12
58.1	51.3	57.5	54.0	55.22
58.34	51.42	57.08	54.28	55.28
	Apr. 1,	8h.		179 59
57.2	57.2	56.5	57.0	56.97
57.4	56.3	57.2	57.2	57.02
56.5	57.2	57.0	57.0	56.92
56.6	57.2	57.4	57.0	57.05
56.9	57.3	57.3	57.4	57.20
56.92	57.02	57.08	57.12	57.03
	Apr. 3,	Day.		179 59
58.0	62.0	58.8	58.0	59.20
57.8	61.6	59.2	58.2	59.20
58.0	61.3	59.2	58.8	59.32
57.4	61.8	59.2	58.7	59.27
57.6	61.6	59.3	58.5	59.25
57.76	61.66	59.14	58.44	59.25
	Apr. 3,	9h.		179 59
57.8	61.6	59.0	58.0	59.10
58.6	62.0	58.6	59.0	59.55
58.4	61.5	58.8	58.9	59.40
58.3	61.8	58.9	59.0	59.50
58.3	61.0	58.9	58.4	59.30
58.28	61.70	58.84	58.66	59.37
	Apr. 3,	19h.		179 59
60.4	64.4	60.6	60.5	61.47
60.7	64.2	61.7	60.4	61.75
60.4	63.4	61.0	60.0	61.20
60.6	64.5	61.4	60.8	61.82
60.3	64.0	60.6	60.3	61.27
60.48	64.1	61.06	60.38	61.50

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	M. s.	′ ″
Venus .	− 0 1.36	
Mercury	+ 0 0.28	

Apr. 1. Error of Runs +0″67.
" 3. do. do. +0.30.
" 3. 19h. Nadir point observed with mic. wire IV at 40r.00.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THERS.	
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.	Ex.
			s.	s.	s.	s.	s.	s.	s.	H. M. s.	° ′ ″	″	″	″	″	Revs.	In.	°	°
Apr. 3	1	α Scorpii	21.0	33.2	45.1	57.8	9.8	22.2	34.2	16 19 57.61	295 3 21.3	29.3	25.7	26.4	25.67	. .	30.456	39.5	32.2
	2	α Herculis	2.2	13.8	25.1	36.2	47.7	59.0	10.0	17 6 36.31	335 40 52.5	57.0	55.3	55.8	55.15	. .	30.454	39.0	31.4
	3	δ Ursæ Minoris	48.0							18 19 23.08	47 41 58.5	51.0	55.8	56.1	55.35	. .			31.6
	4			48.0							53.2	43.0	51.0	49.5	48.92	. .			
	5				49.0						49.0	41.1	48.3	46.7	46.27	. .	30.468	37.0	32.0
	6					54.0					46.7	39.0	46.4	44.0	44.02	. .			
	7						57.0				48.0	41.1	47.7	46.6	45.85	. .			
	8							2.5			51.4	43.2	50.3	49.3	48.55	. .			32.3
	9	α Lyræ	..	13.8	27.2	41.8	56.0	10.0	23.8	18 30 48.77	359 44 49.0	50.7	49.5	51.9	50.27	. .	30.476	37.2	32.3
4	†10	Jupiter, 1st L.	45.5	56.8	8.4	19.2	30.8	42.4	54.0	2 47 19.59	. . . .	..	..	..	. .	. .			
	11	Moon, 1st L.	24.3	36.2	47.5	59.4	10.5	22.3	33.6	7 57 59.11	. . . .	..	..	..	. .	. .			
	12	Hydræ, 2929	8.5	20.0	31.0	42.4	53.4	4.5	15.5	8 31 42.19	. . . .	..	..	..	. .	. .			
	13	ε Hydræ	2.5	13.6	24.6	35.4	46.5	57.5	8.5	8 37 35.51	. . . .	..	..	..	. .	. .			
	14	Hydræ, 3124	29.0	40.5	51.4	2.5	13.5	24.5	35.5	9 1 2.41	. . . .	..	..	..	. .	. .			
	15	α Hydræ	26.5	37.5	48.9	59.9	11.0	22.0	33.0	9 18 59.83	. . . .	..	..	..	. .	. .			
	16	ε Leonis	29.0	41.0	53.0	5.0	17.0	29.1	41.0	9 36 5.04	. . . .	..	..	..	. .	. .			
	17	α Leonis	35.2	46.5	57.5	8.9	20.0	31.4	42.5	9 59 8.86	. . . .	..	..	..	. .	. .			
	18	α Ursæ Majoris	..	..	47.0	11.0	34.5	58.0	22.0	10 53 34.50	. . . .	..	..	..	. .	. .			
	19	δ Leonis	18.5	30.5	42.0	53.5	5.5	17.5	29.3	11 4 53.83	. . . .	..	..	..	. .	. .			
	20	β Leonis	37.4	48.8	0.0	11.5	22.5	34.0	45.5	11 40 11.39	. . . .	..	..	..	. .	. .			
	21	Polaris, S. P.						32.0		13 5 50.30	. . . .	..	..	..	. .	. .			
	22						29.5				. . . .	..	..	..	. .	. .			
	23					22.0					. . . .	..	..	..	. .	. .			
	24				15.0						. . . .	..	..	..	. .	. .			
	25			9.3							. . . .	..	..	..	. .	. .			
	26		14.0								. . . .	..	..	..	. .	. .			
	27	η Bootis	..	..	8.5	20.5	31.7	43.5	55.0	13 46 31.84	. . . .	..	..	..	. .	. .			
	28	α Bootis	2.5	14.0	25.8	37.4	48,9	0.8	12.5	14 7 37.41	. . . .	..	..	..	. .	. .			
	29	α² Libræ	47.2	58.6	10.2	21.5	32.5	44.3	55.4	14 41 21.39	. . . .	..	..	..	. .	. .			
	30	β Libræ	9.5	21.0	31.8	42.5	53.7	4.5	16.0	15 7 42.71	. . . .	..	..	..	. .	. .			
	31	α Serpentis	7.0	18.0	29.0	40.3	51.0	2.3	13.3	15 35 40.13	. . . .	..	..	..	. .	. .			
	32	α Scorpii	20.8	33.3	45.5	57.5	9.6	21.9	34.0	16 18 57.51	. . . .	..	..	..	. .	. .			
5	33	Venus, 2d and N. L.	0.0	11.0	22.0	33.0	44.0	55.0	6.0	22 32 33.00	315 37 31.2	34.4	35.0	33.2	33.45	. .	30.402	55.5	62.0
6	34	Polaris	36.0							1 2 26.14	49 34 66.3	57.1	60.3	63.0	61.67	. .	30.534	54.5	61.6
	35			36.0							54.3	45.3	49.3	51.8	50.17	. .			
	36				28.0						47.0	38.4	43.0	44.5	43.22	. .	30.524	55.3	63.6
	37					24.0					45.5	36.8	40.0	42.1	41.10	. .			
	38						20.0				49.1	40.0	45.0	46.4	45.12	. .			
	39							21.0			55.7	46.5	51.0	53.2	51.60	. .			
	40								18.0		35 9.0	0.0	3.0	6.2	4.55	. .	30.516	56.0	64.8
	†41	Mercury, 1st and S. L.	26.0	..	..	0.5	11.5	23.2	34.5	1 58 7.14	336 37 53.0	56.0	56.0	53.9	54.72	. .	30.504	57.0	64.0
	42	Jupiter, 1st, 2d, & S. L. N. L. (Mic. 4.)	30.5	..	53.3	..	15.8	..	39.0	2 49 5.74	336 34 49.3	55.2	52.6	50.5	51.90	. .	30.486	53.0	64.8
	43		..	44.1	..	6.9	..	29.5	..		“ “ “	“	“	“	“ “	41.030			
	44	ε Hydræ	2.0	12.8	24.0	35.0	46.0	57.1	8.2	8 37 35.01	328 5 24.5	27.8	29.3	26.6	27.05	. .	30.454	59.5	55.3
	45	ι Ursæ Majoris	47.0	3.8	20.2	38.3	53.4	10.0	26.4	8 47 37.01	9 44 35.5	33.5	34.3	37.0	35.07	. .	30.456	59.5	55.2
	46	ϑ Ursæ Majoris	36.2	54.4	12.2	30.2	48.3	6.0	24.2	9 21 30.21	13 28 31.0	25.2	29.0	30.8	29.00	. .	30.456	58.3	54.2
	47	Moon, 1st and N. L. (Mic. 6.)	1.1	12.2	24.0	35.2	46.2	58.0	9.0	9 34 35.10	329 35 28.4	33.0	32.2	32.5	31.52	41.732	30.456	57.8	54.2
	48	β Corvi	..	53.6	5.4	17.5	29.0	41.0	53.0	12 25 23.25	298 35 6.0	8.0	11.3	8.6	8.47	. .	30.434	55.0	49.7
	49	12 Can. Ven.	5.2	19.6	33.8	47.5	1.4	16.0	29.9	12 47 47.63	0 15 7.1	8.7	7.0	9.2	8.00	. .			
	50	Polaris, S. P.							34.0		52 35 16.0	9.0	14.5	12.5	13.00	. .	30.430	55.0	50.9
	51						29.0				34.4	27.8	32.2	32.6	31.75	. .			

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 12h.	0s.
	s.	s.	s.	s.	
Apr. 3	+0.521	−0.342	+0.246	s 62.491	l .008
4	0.521	0.342	0.246	62.678	.012
6	+0.521	−0.342	+0.246	s 63.261	l .014

10. Very unsteady, and hardly visible.
41. Very faint.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
− 0 0.04	− 2 10.47	295 1 15.16	. .	+ 62.52	+ 0 0.97	16 20 1.10	− 26 5 7.09	+ 11.97	−35.37
− 0 0.11	− 0 30.37	335 40 24.89	61.50	.53	0 0.69	17 7 39.53	+ 14 34 2.64	+ 9.08	−10.68
0 0.01	+ 0 57.80	47 41 53.16	. .						
0 0.02	1 3.11	52.05	. .						
0 0.02	1 6.26	52.55	. .	.54	+ 1 30.54	18 21 56.16	+ 86 35 29.87	− 72.69	+18.85
0 0.02	1 7.36	51.40	. .						
0 0.02	1 6.22	52.09	. .						
0 0.02	+ 1 2.90	51.47	. .						
− 0 0.02	− 0 0.25	359 44 50.04	. .	.54	− 0 6.46	18 31 44.85	+ 38 38 27.79	+ 6.93	22.03
. . .	. . .	. . . .	. .	.57	+ 0 0.68	2 48 24.02	. . . .	. .	. .
. . .	. . .	. . . .	. .	.63	0 0.69	8 0 4.17	. . . .	. .	. .
. . .	. . .	. . . .	. .	.64	0 0.84	8 32 45.67	. . . .	9.84	. .
. . .	. . .	. . . .	. .	.64	0 0.73	8 38 38.88	. . . .	10.81	. .
. . .	. . .	. . . .	. .	.64	0 0.82	9 2 5.87	. . . .	9.72	. .
. . .	. . .	. . . .	. .	.65	0 0.82	9 20 3.30	. . . .	9.68	. .
. . .	. . .	. . . .	. .	.65	0 0.63	9 37 8.32	. . . .	11.44	. .
. . .	. . .	. . . .	. .	.65	+ 0 0.71	10 0 12.22	. . . .	10.52	. .
. . .	. . .	. . . .	. .	.66	− 0 23.35	10 54 13.81	. . . .	11.92	. .
. . .	. . .	. . . .	. .	.67	+ 0 0.65	11 5 57.15	. . . .	10.36	. .
. . .	. . .	. . . .	. .	.67	+ 0 0.68	11 41 14.74	. . . .	9.75	. .
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.69	− 3 23.84	13 3 29.15	. . . .	92.42	. .
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.69	− 0 10.92	13 47 23.61	. . . .	8.95	. .
. . .	. . .	. . . .	. .	.70	+ 0 0.66	14 8 40.77	. . . .	8.51	. .
. . .	. . .	. . . .	. .	.71	0 0.87	14 42 24.97	. . . .	10.41	. .
. . .	. . .	. . . .	. .	.71	0 0.82	15 8 46.24	. . . .	10.25	. .
. . .	. . .	. . . .	. .	.72	0 0.73	15 36 43.58	. . . .	9.47	. .
. . .	. . .	. . . .	. .	.73	0 0.88	16 20 1.12	. . . .	11.94	. .
. . .	. . .	. . . .	. .		+ 0 0.80	22 33 35.57	. . . .	. .	. .
+ 0 0.15	+ 0 45.63	49 35 47.45	. .						
0 0.17	0 58.25	48.59	. .						
0 0.19	1 5.30	48.71	. .						
0 0.20	1 7.74	49.04	66.75	63.11	− 0 3.12	1 3 26.13	+ 88 29 21.12	92.47	+70.75
0 0.19	1 5.27	48.39	. .						
0 0.17	0 57.47	49.24	. .						
0 0.14	+ 0 45.13	49.68	. .						
0 0.17	− 0 15.92	336 37 34.32	. .	.12	− 0 6.11	1 59 3.85	+ 15 31 11.47	. .	. .
+ 0 0.17	0 8.01	336 34 44.06	. .	.13	+ 0 0.68	2 50 9.55	+ 15 28 16.56	. .	. .
− 0 0.20	− 0 36.44	328 4 50.61	59.43	.22	0 0.73	8 38 38.96	+ 6 58 30.43	10.84	−34.55
+ 0 0.06	+ 0 10.05	9 44 45.18	. .	.22	0 0.51	8 48 40.74	+ 48 38 25.00	14.23	51.26
− 0 0.23	0 14.06	13 28 42.84	. .	.23	0 0.48	9 22 33.92	+ 52 22 22.66	13.69	60.05
+15 25.70	+11 43.96	330 2 42.98	. .	.23	+ 0 0.72	9 36 41.02	+ 8 56 22.80	. .	. .
+ 0 0.02	− 1 46.63	298 33 21.86	. .	.26	− 0 5.00	12 26 21.51	− 22 32 58.32	9.54	62.79
− 0 0.02	+ 0 0.24	0 15 8.22	. .	.27	+ 0 0.56	12 48 51.46	+ 39 8 48.04	+ 8.71	−65.79
+ 0 0.12	1 39.50	52 36 52.62	. .						
+ 0 0.07	+ 1 19.44	51.26	. .						

NADIR POINTS.				
A.	B.	C.	D.	Means
	Apr. 6,	Day.		° ′ 179 59
63″8	69″2	69″0	64″5	66″63
65.2	70.0	68.5	64.8	67.12
65.3	70.1	68.3	65.5	67.30
64.2	69.2	67.7	64.8	66.48
64.0	69.3	67.0	64.6	66.23
64.50	69.56	68.10	64.84	66.75
	Apr. 6,	8*h*.		179 59
58.5	62.3	58.8	58.5	59.52
58.5	62.3	58.5	58.0	59.33
58.9	62.6	59.3	59.0	59.95
58.3	62.0	58.5	58.0	59.20
58.3	61.6	58.8	58.0	59.17
58.50	62.12	58.78	58.30	59.43
	Apr. 6,	17*h*.		179 59
56.9	60.5	57.5	56.3	57.80
56.4	60.4	57.6	56.5	57.72
56.0	60.1	57.0	56.4	57.38
56.5	60.3	57.4	56.5	57.67
56.1	60.2	58.1	56.5	57.73
56.38	60.30	57.52	56.44	57.66

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Jupiter .	+ 0 1.18	
Moon .	+ 1 1.74	
Venus .	− 0 1.32	
Mercury	− 0 0.30	
Jupiter .		0 16.53
Moon .	+ 1 1.97	

Apr. 3. Error of Runs +0″30.
" 6. do. do. .45. Mic. coincidence, 40.070.
" 6. Day. Exceedingly difficult to observe the nadir point. Air unsteady, and several carts employed close by.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.		TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	TH
				I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.
				s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°
Apr. 6	1		Polaris, S. P. . . .				22.0				13 2 24.20	52 35 36.0	30.0	34.5	35.0	33.87	. .	30.428	54.7
	2					2.0						34.1	27.8	31.8	32.1	31.45	. .		
	3			16.0								14.8	7.6	12.9	12.0	11.82	. .	30.424	54.3
	4	α	Virginis.	30.5	41.8	53.0	4.0	15.0	26.2	37.8	13 16 3.97	310 45 46.9	50.7	52.6	51.6	50.45	. .	30.428	54.5
	5	η	Ursæ Majoris . . .	..	..	..	27.5	43.5	1.0	18.0	13 40 52.50	11 10 55.4	53.5	54.7	55.7	54.82	. .	30.418	54.0
	6	η	Bootis	44.8	56.8	8.1	20.0	31.3	43.0	54.5	13 46 19.79	340 16 41.2	47.3	47.5	44.5	45.12	. .		
	7	α	Bootis	1.8	13.3	25.3	37.0	48.4	0.2	12.0	14 7 36.86	341 5 32.9	36.8	38.8	35.3	35.95	. .	30.406	53.8
	8	η	Draconis	43.2	6.4	30.0	53.0	16.0	39.4	2.8	16 20 52.97	22 57 29.0	25.8	27.8	30.0	28.15	. .	30.372	56.8
	9	α	Ophiuchi	11.5	23.0	34.0	45.6	50.2	7.7	18.8	17 26 45.26	333 47 15.0	20.0	17.6	18.8	17.85	. .	30.380	51.0
	10	γ	Draconis	6.2	24.4	41.6	59.2	17.0	34.0	52.0	17 51 59.20	12 36 24.9	20.4	23.0	25.0	23.32	. .	30.350	52.0
	11	μ¹	Sagittarii	55.5	7.5	19.1	31.2	42.8	54.7	6.3	18 3 31.01	300 2 27.1	30.0	34.0	30.8	30.47	. .	30.382	51.6
	12	α	Lyræ	59.0	12.9	26.8	41.0	54.3	8.8	23.0	18 30 40.83	359 44 42.5	45.0	45.1	44.2	44.20	. .	30.392	51.7
8	13		Venus, 2d L.	21.0	32.0	43.0	54.1	5.0	16.1	27.0	22 36 54.03	. . . .	..	..	..	. .	. .		
	14		Polaris		40.0							. . . .	..	..	..	. .	. .		
	15					32.0						. . . .	..	..	..	. .	. .		
	16						28.0				1 5 55.17	. . . .	..	..	..	. .	. .		
	17							19.0				. . . .	..	..	..	. .	. .		
	18								20.0			. . . .	..	..	..	. .	. .		
	19									12.0		. . . .	..	..	..	. .	. .		
9	20	α	Hydræ	24.5	35.5	46.4	57.5	8.5	19.5	30.5	9 18 57.49	. . . .	..	..	..	. .	. .		
	21	ε	Leonis	26.8	38.8	50.6	2.8	14.5	26.8	38.8	9 36 2.73	. . . .	..	..	..	. .	. .		
	22	α	Leonis	33.0	44.3	55.4	6.5	17.5	29.2	40.3	9 59 6.60	. . . .	..	..	..	. .	. .		
	23	α	Ursæ Majoris . . .	..	..	44.0	8.0	32.0	55.0	19.0	10 53 31.60	. . . .	..	..	..	. .	. .		
	24	δ	Leonis	16.3	28.0	39.5	51.5	3.3	15.0	27.0	11 4 51.51	. . . .	..	..	..	. .	. .		
	25	γ	Cephei, S. P. . . .	33.0	21.0	9.0	56.5	44.2	32.0	20.6	11 31 56.61	. . . .	..	..	..	. .	. .		
	26	γ	Ursæ Majoris . . .	43.0	2.0	21.0	40.0	58.0	17.5	36.5	11 44 39.71	. . . .	..	..	..	. .	. .		
	27		Moon, 1st L. . . .	11.6	23.0	34.3	45.3	56.3	8.0	19.1	11 57 45.37	. . . .	..	..	..	. .	. .		
	28		Polaris, S. P. . .					31.0				. . . .	..	..	..	. .	. .		
	29						22.5					. . . .	..	..	..	. .	. .		
	30					16.0					13 9 19.00	. . . .	..	..	..	. .	. .		
	31				8.0							. . . .	..	..	..	. .	. .		
	32			17.5								. . . .	..	..	..	. .	. .		
	33		Venus, 1st and N. L.	39.5	50.0	1.5	12.6	23.7	34.6	45.4	22 39 12.47	315 43 1.1	6.5	7.5	6.4	5.37	. .	30.290	48.8
	†34		(S. L. Mic. 4.)	..	..	..	..	..	..	..	. . . . .	“ “ “	“	“	“	“ “	39.000		
	35	γ	Cephei	..	..	9.3	57.0	44.5	33.0	21.0	23 32 44.36	37 51 60.7	54.0	57.0	57.8	57.37	. .	30.288	57.5
	36		Polaris		38.0							49 34 51.5	42.9	49.5	49.0	48.22	. .		
	37					32.0						44.1	36.0	40.5	41.3	40.47	. .		
	38						26.0				1 5 55.33	42.3	33.5	38.0	39.8	38.40	. .	30.246	35.2
	39							19.0				45.0	36.8	41.3	42.5	41.40	. .		
	40								21.0			52.8	44.0	56.0	50.2	50.75	. .		
	41									16.0		66.9	58.8	62.3	64.2	63.05	. .		
10	42	γ	Ursæ Majoris . . .	42.5	1.5	20.3	39.3	58.0	17.0	35.9	11 44 39.21	15 38 61.6	58.2	60.5	60.1	60.16	. .	30.054	59.3
13	43	β	Corvi	36.3	49.0	0.4	12.5	24.5	36.3	48.2	12 25 12.46	298 35 7.9	11.0	15.3	12.1	11.07	. .	30.060	46.0
	44	12	Can. Venat. . . .	0.8	15.0	29.2	43.1	57.3	11.5	25.6	12 47 43.21	0 15 9.5	11.9	11.1	12.4	11.22	. .		
	45		Polaris, S. P. . .							21.0		52 35 16.2	9.6	15.7	14.0	13.87	. .		
	46							20.0			12 57 0.75	34.1	27.3	34.1	33.5	32.25	. .	30.060	45.5
	47						12.0					38.5	33.6	39.5	37.5	37.27	. .		
	48					10.0						34.8	28.7	34.5	33.2	32.80	. .		
	49	α	Virginis.	26.0	37.1	48.3	59.2	10.4	21.8	33.0	13 15 59.40	310 45 47.8	52.1	55.4	53.4	52.17	. .	30.060	45.3
	†50		Moon, 2d and S. L.	..	..	47.0	59.4	11.0	23.0	34.8	15 33 11.04	302 47 7.9	11.7	14.0	11.5	11.27	43.095	30.084	44.0
	†51		(Mic. 2.)	..	..	..	..	..	..	..	. . . . .	“ “ “	“	“	“	“ “	43.010		
	†52			..	..	..	..	..	..	..	. . . . .	“ “ “	“	“	“	“ “	42.855		

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 10h.	0s.
	s.	s.	s.	s.	
Apr. 6	+0.521	—0.342	+0.246	s 63.261	l .014
9	0.521	0.342	0.246	65.036	.025
10	0.521	0.342	0.246	65.368	.027
13	+0.521	—0.342	—0.246	s 67.851	l .032

34. Correction of S. Cusp. for defective illumination, —0″.71.
50, 51, 52. Observed for declination at wires III, IV and V.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.07	+ 1 16.98	52 36 50.92	58.54	+ 63.27	+ 0 5.28	13 3 32.75	+ 88 29 27.98	+ 92.49	+70.75
0 0.07	1 19.44	50.96		.27					
+ 0 0.13	+ 1 38.86	50.81	. .						
— 0 0.12	— 1 8.34	310 44 41.99	. .	.27	+ 0 0.83	13 17 8.07	— 10 21 37.30	9.77	—61.66
+ 0 0.17	+ 0 11.67	11 11 6.66	. .	.28	— 0 25.08	13 41 30.70	+ 50 4 47.37	6.94	60.36
0 0.19	— 0 21.23	340 16 24.08	. .	.28	+ 0 0.66	13 47 23.73	+ 19 10 4.79	8.93	59.36
+ 0 0.06	— 0 20.22	341 5 15.79	. .	.29	0 0.66	14 8 40.81	+ 19 58 56.50	8.48	62.12
— 0 0.07	+ 0 25.15	22 57 53.23	. .	.32	0 0.41	16 21 56.70	+ 61 51 33.94	1.43	19.48
+ 0 0.10	— 0 29.22	333 46 48.73	57.66	.34	0 0.70	17 27 49.30	+ 12 40 30.32	9.26	— 6.11
— 0 0.06	+ 0 13.32	12 36 36.48	. .	.34	0 0.49	17 53 3.03	+ 51 30 18.17	4.23	+ 9.60
+ 0 0.07	— 1 42.45	300 0 48.09	. .	.35	0 0.92	18 4 35.28	— 21 5 30.32	12.28	— 4.56
+ 0 0.04	— 0 0.25	359 44 43.99	. .	.36	0 0.56	18 31 44.75	+ 38 38 25.58	6.83	+21.80
. . .	. . .	. . . .	. .	64.70	+ 0 0.80	22 37 58.27	. . . .	. .	. .
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.76	— 3 30.16	1 3 29.77	. . . .	92.47	71.76
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.97	+ 0 0.82	9 20 3.28	. . . .	9.75	. .
. . .	. . .	. . . .	. .	.98	0 0.64	9 37 8.35	. . . .	11.51	. .
. . .	. . .	. . . .	. .	.99	+ 0 0.70	10 0 12.29	. . . .	10.58	. .
. . .	. . .	. . . .	. .	65.00	— 0 23.33	10 54 13.27	. . . .	12.03	. .
. . .	. . .	. . . .	. .	.01	+ 0 0.65	11 5 57.17	. . . .	10.40	. .
. . .	. . .	. . . .	. .	.02	0 0.90	11 33 2.53	. . . .	11.34	80.49
. . .	. . .	. . . .	. .	.03	0 0.48	11 45 45.22	. . . .	9.96	. .
. . .	. . .	. . . .	. .	.04	+ 0 0.79	11 59 53.94	. . . .	. .	. .
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.06	— 6 51.85	13 3 32.21	. . . .	92.43	71.93
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
+ 0 0.03	— 0 43.61	315 42 2.68	61.34	.01	+ 0 0.80	22 40 17.06	— 5 24 19.41	. .	. .
— 0 37.50	— 0 44.30	. . . .	. .	. .	. . .	. . .	. . . .	. .	. .
— 0 0.02	+ 0 44.98	37 52 42.33	. .	.03	— 0 47.62	23 33 1.77	+ 76 46 20.24	11.32	80.59
+ 0 0.03	0 57.21	49 35 45.46	. .						
0 0.03	1 4.57	44.87	. .						
0 0.03	1 7.01	45.44	. .	.07	— 3 31.44	1 3 28.96	+ 88 29 23.98	92.39	+72.11
0 0.03	1 4.34	45.77	. .						
0 0.03	0 56.72	47.50	. .						
0 0.02	0 44.30	47.37	. .						
0 0.00	+ 0 16.08	15 39 16.18	. .	.36	+ 0 0.47	11 45 45.04	+ 54 32 54.09	9.98	—72.61
+ 0 0.26	— 1 49.47	298 33 21.86	58.79	67.87	0 0.93	12 26 21.26	— 22 32 57.68	9.54	61.97
— 0 0.06	+ 0 0.24	0 15 11.40	. .	.88	0 0.56	12 48 51.65	+ 39 8 51.87	8.71	—67.33
0 0.15	1 41.43	52 36 55.15	. .						
0 0.09	1 20.82	52.98	58.93	.89	5 15.23	13 3 23.87	+ 88 29 25.60	91.65	+73.28
0 0.08	1 18.04	55.23	. .						
0 0.09	+ 1 20.28	52.99	. .						
0 0.28	— 1 9.21	310 44 43.24	59.08	.89	+ 0 0.83	13 17 8.12	— 10 21 36.59	+ 9.73	—61.36
12 53.66	+62 35.86	303 36 53.47	. .						
12 56.58	62 36.87	51.56	. .	.96	— 0 10.59	15 32 59.81	— 17 29 28.36	. .	. .
—13 1.56	+62 37.94	47.65	. .						

NADIR POINTS. A.	B.	C.	D.	Means
	Apr.9,	Day.		° ′
				179 59
60″0	63″7	62″2	60″2	61″52
59.4	63.6	62.0	59.5	61.13
60.0	63.3	62.0	60.4	61.42
59.4	63.8	61.9	59.8	60.97
60.3	63.5	62.5	60.4	61.67
59.82	63.38	62.12	60.06	61.34
	Apr.13	8.5*h*.		179 59
56.2	61.5	60.2	57.6	59.00
55.8	60.8	59.5	56.8	58.22
56.5	61.6	60.4	57.5	59.00
56.5	61.3	60.2	57.8	58.95
56.37	61.30	60.08	57.42	58.79
	Apr.13	16*h*.		179 59
57.2	61.0	59.3	57.1	58.65
58.0	61.5	59.6	57.8	59.23
57.8	61.6	60.3	58.3	59.50
57.8	61.3	59.5	57.5	59.02
57.8	61.2	59.5	57.6	59.02
57.72	61.32	59.60	51.66	59.08
	Apr.13	Day.		179 59
58.0	62.5	60.0	58.0	59.62
58.7	63.3	60.4	58.0	60.10
56.0	61.0	58.0	56.8	57.95
60.0	63.5	62.0	58.7	61.05
58.7	62.3	59.3	58.0	59.58
58.28	62.52	59.94	57.74	59.66

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Venus .	— 0 1.26	
Moon .	+ 1 2.74	
Venus .	— 0 1.22	0 19.11
Moon .	— 1 8.60	

Apr. 9. Error of Runs +0″.07. Mic. coincidence, 40r.093.
" 13. do. do. +0.87. " " 40r.070.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE&MICROMETER READINGS.						Barometer.	TI
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		A
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	
Apr. 13	1	β¹ Scorpii	48.2	0.0	12.0	23.8	35.0	47.0	8.3	15 56 23.47	301 45 5.5	8.9	14.3	12.0	10.17	. .	30.086	43
	2	Venus, 2d and N. L. .	37.0	48.0	59.0	10.0	21.0	32.0	43.0	22 49 10.00	316 0 33.2	38.3	40.0	39.7	37.80	. .	30.203	47
	3	Polaris	35.0							1 3 24.36	49 34 56.2	48.1	51.6	53.7	52.40	. .	30.178	50
	4			39.5							46.8	37.7	40.0	42.8	41.82	. .		
	†5				29.0						38.7	29.1	30.1	36.5	33.60	. .		
	6					28.0					37.8	29.5	31.0	36.0	33.57	. .	30.164	51
	7						16.0				40.1	30.5	32.0	38.0	35.15	. .		
	8							15.0			46.3	37.0	39.8	45.0	42.02	. .		
	9								8.0		60.0	52.0	54.0	58.0	56.00	. .	30.164	51
14	10	α Cassiopeiæ	41.3	1.0	20.1	40.0	59.3	19.0	38.3	0 31 39.86	16 47 32.0	29.5	30.3	32.2	31.00	. .	30.130	54
	11	Polaris		36.0						1 6 52.33	49 34 45.5	38.6	43.3	43.5	42.72	. .	30.138	55
	12				27.0						38.7	30.1	35.3	35.5	34.90	. .		
	13					26.0					35.2	27.2	31.5	32.3	31.55	. .	30.140	55
	14						14.0				38.8	30.1	34.5	35.7	34.77	. .		
	15							16.0			48.1	40.0	45.6	45.0	44.67	. .		
	16								15.0		61.4	52.6	57.5	57.6	57.27	. .	30.138	56
15	†17	Sun, 1st and N. L. (Mic. 4.)	6.8	18.0	29.0	40.0	51.2	2.5	13.3	1 32 40.11	331 8 55.4	58.9	59.1	57.7	57.78	44.210		
	18	Sun, 2d and S. L. (Mic. 1.)	..	28.0	39.0	50.0	1.2	12.3	23.5	1 34 55.67	330 57 24.4	28.3	27.2	25.5	26.35	34.210	30.146	56
	19	Jupiter, 1st and N. L.	29.0	..	52.0	..	14.2	..	37.8	2 58 4.26	337 11 25.0	30.0	27.6	30.4	28.25	. .	30.150	57
	†20	Jupiter, 2d and S. L. (Mic. 4.)	..	42.6	..	5.2	..	28.0	..		“ “ “	“	“	“	“ “	39.210		
	21	15 Argus	..	27.5	39.5	51.5	3.5	15.8	..	8 0 51.56	297 14 57.0	60.0	63.0	59.0	59.75	. .	30.220	51
	22	ε Hydræ	57.0	8.1	19.0	30.0	41.0	52.1	3.0	8 38 30.03	328 5 27.4	31.8	34.7	27.0	30.22	. .	30.235	56
	23	ι Ursæ Majoris . . .	42.1	58.8	15.3	31.9	48.0	4.9	21.1	8 48 31.73	9 44 39.0	36.2	39.1	35.0	37.32	. .	30.235	56
	24	α Scorpii	15.9	28.0	40.0	52.1	4.5	17.0	29.0	16 19 52.36	295 3 21.5	26.1	29.2	26.3	25.77	. .	30.364	46
	25	ε Ursæ Minoris . . .	44.5	7.0	28.5	50.0	10.5	33.5	54.0	17 1 49.71	. . . .	..	..	..	. .	. .		
	26	α Ophiuchi	7.0	18.2	29.0	40.5	51.7	3.2	14.3	17 27 40.56	. . . .	..	..	..	. .	. .		
	27	Moon, 2d L. . . .	28.5	41.0	53.0	4.8	16.5	28.9	40.5	17 34 4.74	. . . .	..	..	..	. .	. .	30.374	45
	28	γ Draconis	2.0	19.7	37.0	54.5	12.4	30.1	47.4	17 52 54.73	12 36 32.0	27.0	29.5	26.5	28.75	. .	30.402	44
	29	μ¹ Sagittarii	51.2	3.3	14.9	26.3	38.3	50.3	0.8	18 4 26.44	300 2 33.5	35.4	41.0	36.7	36.65	. .	30.402	44
	30	Venus, 2d and N. L.	1.6	12.8	23.7	34.5	45.8	56.8	8.0	22 55 34.74	316 13 26.5	30.9	32.4	31.0	30.20*d*	. .	30.470	47
	31	Venus, S. L. (Mic. 4.)	..	..	..	..	..	..	..	. . . .	“ “ “	“	“	“	“ “	39.100		
	32	α Andromedæ . . .	41.0	53.5	6.0	18.2	30.3	43.0	55.6	0 0 18.23	349 20 55.2	59.8	58.5	57.5	57.75	. .	30.472	49
	33	Polaris	28.0							1 3 23.29	49 34 58.3	49.6	55.0	56.2	54.78	. .	30.466	50
	34			36.0							46.0	38.0	43.9	44.1	43.00	. .		
	35				26.0						38.7	30.4	34.7	36.4	35.05	. .		
	36					26.0					36.4	27.7	32.0	33.5	32.40	. .	30.452	51
	37						18.0				39.4	30.4	35.4	36.1	35.32	. .		
	38							19.0			46.9	38.4	44.4	44.0	43.42	. .		
	39								10.0		58.5	49.1	55.2	56.0	54.70	. .	30.448	51
16	40	Sun, 1st and N. L. (Mic. 5.)	48.0	59.1	10.2	22.0	33.1	44.0	55.0	1 36 21.63	331 27 4.0	8.3	6.8	4.7	5.94	39.400		
	41	Sun, 2d and S. L. (Mic. 3.)	58.0	9.1	20.0	31.3	42.5	53.7	4.8	1 38 31.34	331 6 51.4	55.7	57.2	55.0	54.82	39.400	30.496	52
	42	Jupiter, 1st, 2d, & N. L.	23.2	..	46.4	..	9.0	..	32.0	2 58 58.74	337 15 28.4	32.8	32.7	33.0	31.72	. .	30.402	54
	43		..	37.2	..	59.8	..	22.5	..									
	44	α Persei	23.0	40.0	56.5	13.3	30.2	47.2	4.0	3 13 13.46	10 24 41.4	38.1	43.3	41.7	41.12	. .	30.404	54
	45	Weisse, VIII, 1529. .	..	..	..	..	58.0	9.0	20.5	9 0 9.17	308 25 37.2	39.1	45.7	42.6	41.15	. .	30.320	53
	46	α Hydræ	20.8	32.0	43.0	54.2	5.3	16.6	27.2	9 19 54.16	313 7 20.2	22.7	24.9	23.3	22.78	. .	30.320	53

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 12*h*.	0*s*.
	s.	s.	s.	s.	
Apr. 13	+0.521	—0.342	+0.246	*s* 67.851	*l* .032
14	.521	.342	.246	8.139	.001
15	.521	.342	.246	8.214	.004
16	+0.521	—0.342	+0.246	*s* 8.190	*l* .006

5, 17. Exceedingly faint.
20. Very faint.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
− 0 0.05	− 1 37.25	301 43 32 97	59.08	+ 67.97	+ 0 0.91	15 56 32.35	− 19 22 46.38	+ 11.04	−38.70
0 0.19	− 1 1.46	315 59 36.15	59.66	+ 68.24	+ 0 0.80	22 50 17.88	− 5 6 44.26	. .	. .
0 0.18	+ 0 46.11	49 35 38.33	. .						
0 0.21	0 58.70	40.31	. .						
0 0.23	1 5.72	39.09	. .						
0 0.23	1 8.16	41.50	. .	.14	− 0 3.12	1 3 29.38	+ 88 29 19.76	91.52	+73.43
0 0.23	1 5.71	40.63	. .						
0 0.21	0 58.09	39.90	. .						
− 0 0.17	0 45.58	41.41	. .						
+ 0 0.05	0 17.41	16 47 48.46	60.80	.14	+ 0 0.46	0 31 48.46	+ 55 41 26.91	13.24	80.06
− 0 0.28	0 58.40	49 35 40.84	. .						
0 0.30	1 5.25	39.85	. .						
0 0.31	1 7.60	38.84	. .						
0 0.26	1 5.17	39.68	. .	.14	− 3 30.16	1 3 30.31	+ 88 29 18.99	91.23	+73.72
0 0.24	0 57.56	41.99	. .						
− 0 0.22	+ 0 45.02	42.07	. .						
+ 2 21.60	− 0 27.62	330 54 52.58	. .	+ 8.20	+ 0 0.71 − 0 4.81	1 33 54.04	+ 9 48 31.03	. .	. .
−18 4.60	0 28.35		. .						
+ 0 0.04	0 23.06	337 10 49.92	. .	.20	+ 0 0.68	2 58 13.14	+ 16 4 28.37	. .	. .
− 0 30.45	0 23.18		. .						
0 0.00	1 52.69	297 13 7.06	60.94	.20	0 0.85	8 1 0.61	− 23 53 14.63	8.83	−14.86
+ 0 0.04	− 0 36.46	328 4 53.80	. .	.20	0 0.73	8 38 38.96	+ 6 58 32.11	10.96	34.73
+ 0 0.03	+ 0 10.07	9 44 47.42	. .	.20	0 0.51	8 48 40.44	+ 48 38 25.73	14.46	52.30
− 0 0.03	− 2 8.63	295 1 17.11	. .	.23	+ 0 0.97	16 20 1.56	− 26 5 4.58	+ 11.66	−34.63
. . .	. . .	. . . .	. . .	.23	− 0 0.20	17 1 57.74	. . . .	− 28.50	. .
. . .	. . .	. . . .	. .	.23	+ 0 0.70	17 27 49.49	. . . .	+ 9.03	. .
. . .	. . .	. . . .	. .	.24	0 0.91	17 33 3.35	. . . .	. .	. .
− 0 0.04	+ 0 13.59	12 36 42.30	. .	.24	0 0.49	17 53 3.46	+ 51 30 20.61	3.90	+ 8.27
+ 0 0.04	− 1 44.86	300 0 51.83	. .	.24	0 0.65	18 4 35.33	− 21 5 29.86	12.01	− 4.81
0 0.00	0 44.82	316 12 28.63	62.17	8.11	0 0.80	22 55 42.53	− 4 53 54.29	. .	. .
− 0 33.41	0 44.91		. .						
0 0.00	− 0 11.08	349 20 46.17	. .	.12	+ 0 0.61	0 0 26.96	+ 28 14 23.25	11.86	+80.56
0 0.23	+ 0 46.17	49 35 40.72	. .						
0 0.26	0 58.94	41.68	. .						
0 0.27	1 6.13	40.91	. .						
0 0.29	1 8.61	40.72	. .	.12	− 0 3.12	1 3 28.29	+ 88 29 18.14	90.97	74.00
0 0.27	1 6.12	41.17	. .						
0 0.26	0 58.45	41.61	. .						
− 0 0.23	+ 0 46.15	40.62	. .						
+ 5 23.35	− 0 27.47	331 16 6.01	. .	.13	+ 0 0.71	1 37 35.32	+ 10 9 43.09	. .	. .
− 6 16.40	0 28.20		. .						
0 0.05	− 0 39.37	337 14 52.30	. .	.14	0 0.68	2 59 7.56	+ 16 8 29.38	. .	. .
0 0.06	+ 0 10.66	10 24 51.71	. .	.14	+ 0 0.50	3 13 22.10	+ 49 18 28.80	16.38	+51.69
− 0 0.01	− 1 14.26	308 24 26.88	60.14	.17	− 0 21.57	8 59 55.77	− 12 41 54.01	9.65	−33.81
+ 0 0.02	− 1 3.03	313 6 19.77	. .	.17	+ 0 0.82	9 20 3.15	− 8 0 1.12	+ 9.85	−39.72

NADIR POINTS. A.	B.	C.	D.	Means
	Apr.14	0h.		° ′ 179 59
58″6	62″6	62″8	59″3	60″82
58.8	63.3	62.4	58.6	60.78
58.5	62.5	62.5	59.4	60.73
59.2	62.8	62.1	59.2	60.84
58.5	62.9	62.7	59.3	60.85
58.72	62.82	62.50	59.16	60.80
	Apr.15	Night.		179 59
61.0	64.2	62.3	57.5	61.25
60.2	63.0	61.0	58.4	60.65
61.0	64.1	62.1	58.3	61.37
61.0	64.0	61.8	58.0	61.20
60.0	63.0	61.1	58.8	60.72
60.0	62.8	61.0	58.0	60.45
60.0	62.0	61.5	58.8	60.37
61.0	63.7	61.0	59.0	61.18
61.0	64.0	61.8	58.9	61.43
61.0	63.8	60.5	58.0	60.82
60.62	63.46	61.41	58.29	60.94
	Apr.15	23h.		179 59
60.7	63.8	63.2	60.9	62.15
60.5	63.3	63.8	60.7	62.07
60.4	64.0	63.8	60.4	62.15
60.4	63.6	64.0	61.0	62.25
60.3	63.6	64.1	61.0	62.25
60.46	63.66	63.78	60.80	62.17
	Apr.16	8h.		179 59
59.1	62.2	62.4	58.0	60.42
58.7	62.2	62.0	57.8	60.18
58.3	62.2	61.6	58.1	60.05
58.4	61.8	61.8	58.2	60.05
58.4	62.0	61.9	57.8	60.02
58.58	62.08	61.94	57.98	60.14
	Apr.16	14h.		179 59
57.9	61.6	61.5	58.0	59.75
58.3	61.5	61.5	58.4	59.92
58.3	61.3	61.3	58.5	59.85
58.2	61.2	61.3	58.2	59.73
58.2	61.2	61.0	58.0	59.60
58.18	61.36	61.32	58.22	59.77

No.	Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
		m. s.	′ ″
	Venus .	− 0 1.16	
	Sun . .	. . . .	15 59.18
	Jupiter .	. . . .	0 15.30
	Moon .	1 10.54	
	Venus .	− 0 1.12	0 16.75
	Sun . .	. . . .	15 55.79

Apr. 13. Error of Runs, +0″87. Mic. coincidence, 40r.070.
" 14. do. do. 0.20.
" 15. do. do. 0.28. Mic. coincidence, 40r.071.
" 16. do. do. +0.48.
" 13, 23*h.*, 10*m.* Clock set forward 1*m.*

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°
Apr. 16	†1	ε Leonis	23.1	35.2	47.2	59.2	11.4	23.6	35.2	9 36 59.27	345 35 11.7	12.5	15.2	14.0	13.35	. .	30.326	52.2	47.2
	2	α Leonis	29.4	41.0	52.1	3.4	14.3	25.7	37.0	10 0 3.27	333 49 32.8	38.7	37.5	38.0	36.75*d*	. .	30.330	51.5	46.7
	3	12 Can. Venat.	0.3	14.5	28.8	43.0	57.0	11.1	25.2	12 48 42.84	0 15 13.1	13.9	13.6	14.3	13.72	. .	30.330		
	4	Polaris, S. P.							33.0	13 3 20.80	52 35 20.3	13.0	20.2	17.7	17.80	. .	30.312	50.0	45.0
	5						28.0				40.2	33.8	40.3	38.3	38.15	. .			
	6					17.0					42.0	35.8	43.5	41.0	40.58	. .	30.316	49.5	44.6
	7				15.0						39.0	31.7	38.5	36.6	36.45	. .			
	8		11.0								19.2	11.8	18.2	16.0	16.37	. .	30.314	49.3	44.0
	9	α Virginis	25.2	37.0	48.0	59.2	10.8	21.6	33.3	13 16 59.30	310 45 49.9	52.0	57.1	55.5	53.62	. .			
	10	Venus, 2d and N. L.	49.0	0.0	11.1	22.1	33.1	44.2	55.2	22 58 22.10	316 20 43.0	47.0	49.5	46.5	46.50	. .	30.300	54.0	63.0
	11	Polaris, S. P.						29.5		13 8 54.70	52 35 37.5	32.2	41.8	37.0	37.12	. .			
	12					21.5					47.0	42.0	50.0	46.0	46.25	. .			
17	13				19.0						45.0	41.0	47.5	44.0	44.38	. .	30.220	63.0	60.5
	14			11.0							37.5	33.8	39.5	36.7	36.88	. .			
	15		12.5								26.7	21.4	27.0	25.0	25.02	. .			
	16	η Ursæ Majoris	30.5	47.4	4.4	21.5	38.5	55.6	12.6	13 41 21.50	11 11 4.0	1.2	6.2	3.5	3.72	. .	30.231	62.5	61.0
	17	μ^1 Sagittarii	50.5	2.8	14.5	26.0	37.6	49.7	1.4	18 4 26.07	300 2 24.0	28.0	33.0	27.5	28.12	. .	30.210	60.2	56.3
	18	Venus, 2d and N. L.	39.8	51.0	2.2	13.0	23.8	35.0	46.0	23 1 12.97	316 28 40.1	46.9	49.8	45.8	45.65	. .	30.256	62.0	70.6
	†19	α Andromedæ	40.0	52.2	4.8	..	..	42.2	54.5	0 0 14.74	349 20 51.5	58.2	57.1	58.5	55.32	. .	30.256	65.8	75.2
	20	Polaris	35.0							1 3 26.14	49 34 59.5	52.5	58.0	60.2	57.55	. .	30.246	68.3	76.5
	21			35.0							45.5	38.9	45.5	47.1	45.25	. .			
	22				28.0						38.3	31.3	38.5	40.2	37.08	. .			
	23					26.0					36.9	29.5	36.1	37.8	35.07	. .	30.232	69.5	77.0
	24						14.0				40.2	33.0	40.0	41.0	38.55	. .			
	25							14.0			47.8	40.4	48.5	49.3	46.50	. .			
	26								11.0		61.3	53.6	60.4	61.8	60.03	. .	30.228	70.0	78.3
18	27	Sun, 1st and N. L. (Mic. 3.)	11.5	22.2	34.0	45.2	56.3	7.7	18.8	1 43 45.10	332 20 55.6	61.7	61.9	62.3	60.37	39.250			
	†28	Sun, 2d and S. L. (Mic. 4.)	21.8	33.2	44.0	55.4	6.6	18.0	29.0	1 45 55.43	331 37 19.2	24.7	26.5	24.3	23.67	39.250	30.222	71.0	79.3
	29	12 Can. Venat.	59.4	13.8	27.2	42.0	56.0	10.2	24.3	12 48 14.84	0 15 12.6	16.5	17.4	18.8	16.32	. .			
	30	Polaris, S. P.							36.0	13 3 20.60	52 35 26.0	20.5	28.3	27.0	25.45	. .	30.060	68.2	66.1
	31						25.0				44.4	39.7	48.6	45.8	44.62	. .			
	32					18.0					46.1	40.8	49.2	47.0	45.78	. .	30.058	68.0	66.1
	33				15.0						42.8	37.2	47.2	44.3	42.88	. .			
	34		9.0								22.3	16.4	25.3	23.9	21.98	. .	30.052	67.8	65.5
	35	α Virginis	24.8	36.0	47.1	58.2	9.0	20.8	31.8	13 16 58.24	310 45 45.3	51.3	56.6	55.5	51.68	. .	30.054	68.0	65.7
19	†36	Jupiter, 1st and S. L.	7.1	18.8	30.2	41.8	52.9	4.7	15.8	3 1 41.61	337 26 50.6	61.2	58.5	56.1	56.60	. .	30.172	62.5	72.5
	37	ι Ursæ Majoris	40.8	57.5	14.2	30.5	47.4	4.0	20.4	8 48 30.69	9 44 38.2	39.8	41.0	39.0	39.50	. .	30.230	66.5	66.0
	†38	Cancri, 3115	41.4	53.0	4.5	16.0	27.4	39.0	50.5	9 0 15.97	339 11 51.0	58.0	56.5	54.5	55.00	. .	30.230	66.5	66.0
	39	α Hydræ	..	31.0	..	53.0	4.0	15.4	26.4	9 20 1.96	313 7 20.1	26.0	28.5	27.0	25.40	. .	30.230	66.5	66.0
	40	β Draconis	56.0	14.5	32.8	50.9	7.5	25.6	43.5	17 26 50.11	13 31 3.0	4.0	7.0	4.0	4.50	. .	30.400	57.0	44.5
	41	γ Draconis	1.3	19.0	36.5	54.0	12.0	29.8	47.0	17 52 54.23	12 36 30.8	31.6	33.0	32.0	31.86	. .	30.400	56.2	44.2
	42	μ^1 Sagittarii	50.5	2.3	13.5	25.5	37.3	49.0	0.8	18 4 25.56	300 2 30.6	37.5	41.0	38.0	36.78	. .	30.400	56.2	44.0
	43	β Lyræ	36.5	50.0	2.7	15.9	28.8	42.0	55.0	18 44 15.84	. . . .	..	..	..	. .	. .			
	†44	α Aquilæ	34.5	45.7	56.7	7.7	18.5	30.5	41.5	19 43 7.87	. . . .	..	..	..	. .	. .			
	45	Venus, 2d and N. L.	34.0	42.8	53.7	4.5	15.5	26.6	37.4	23 7 4.64	316 46 27.7	37.2	37.9	35.0	34.45*d*	. .	30.500	58.0	61.0
	†46	(S. L. Mic. 4.)	..	..	..	..	..	..	..		“ “ “	“	“	“	“ “	39.140			
	47	α Andromedæ	39.6	52.2	4.0	17.0	29.2	41.2	54.0	0 0 16.80	349 20 50.6	59.8	55.4	55.5	55.32	. .	30.506	60.0	64.0
	48	Polaris	37.0								49 34 52.3	48.0	54.2	53.0	51.87	. .	30.502	61.2	66.9
	49			39.0							39.8	34.4	42.5	40.4	39.28	. .			
	50				33.0						32.6	27.5	34.6	33.2	31.97	. .			

DATE.	VALUE OF m.	n.	c.	CLOCK. At 12*h*.	H. Rate. 0*s*.
	s.	s.	s.	s.	
Apr. 16	+0.521	—0.342	+0.246	*s* 8.190	*l* .006
17	.521	.342	.246	8.564	.008
18	.521	.342	.246	9.100	.009
19	+0.521	—0.342	+0.246	*s* 8.987	*l* .010

1. Stars well defined and tolerably steady.
19. Faint, and observed on horizontal wire, after passing wire VII.
28. Sun's limb very well defined.
36. Very unsteady, and badly defined.
38. Recorded 8*h*. 56*m*.
44. Very unsteady.
46. Correction of S. Cusp. for defective illumination, —0″.55.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.12	− 0 15.36	345 34 57.87	. .	+ 8.18	+ 0 0.63	9 37 8.08	+ 24 28 36.98	+ 11.61	−53.86
+ 0 0.01	− 0 29.16	333 49 7.60	59.95	.18	0 0.70	10 0 12.15	+ 12 42 46.90	10.67	54.07
− 0 0.03	+ 0 0.24	0 15 13.93	. .	.19	0 0.56	12 48 51.59	+ 39 8 53.23	8.71	−68.00
0 0.15	1 40.73	52 36 58.38	. .						
0 0.07	1 21.13	59.21	. .						
0 0.06	1 17.66	58.18	59.77	.20	0 3.02	13 3 32.02	+ 88 29 22.84	90.86	+74.13
0 0.08	1 20.19	56.56	. .						
0 0.15	+ 1 39.85	56.07	. .						
− 0 0.14	− 1 8.89	310 44 44.59	. .	.20	0 0.83	13 17 8.33	− 10 21 35.93	9.71	−61.27
+ 0 0.04	− 0 59.43	316 19 47.11	61.89	.46	+ 0 0.80	22 58 30.25	− 4 46 35.53	. .	. .
0 0.00	+ 1 24.92	52 36 62.04	. .						
0 0.00	1 15.06	61.31	. .						
0 0.00	1 17.52	61.90	. .	.57	− 5 27.60	13 3 35.67	+ 88 29 21.84	90.64	+74.38
0 0.00	1 24.72	61.60	. .						
0 0.00	1 37.17	62.19	. .						
+ 0 0.12	+ 0 11.36	11 11 15.20	. .	.58	+ 0 0.49	13 41 30.57	+ 50 4 52.56	6.87	−63.06
− 0 0.16	− 1 39.38	300 0 48.30	. .	.15	0 0.92	18 4 35.14	− 21 5 34.56	11.95	− 4.87
0 0.00	1 0.03	316 27 45.68	60.43	.98	0 0.80	23 1 21.75	− 4 38 35.57	. .	. .
0 0.10	− 0 10.53	349 20 44.77	. .	.99	+ 0 3.09	0 0 26.82	+ 28 14 23.61	11.83	+80.67
0 0.30	+ 0 43.12	49 35 40.37	. .						
0 0.35	0 55.61	40.51	. .						
0 0.39	1 2.88	39.57	. .						
0 0.40	1 5.31	39.98	. .	9.00	− 0 3.12	1 3 32.02	+ 88 29 19.51	90.54	+74.51
0 0.37	1 2.91	41.99	. .						
0 0.34	0 55.20	41.36	. .						
0 0.28	+ 0 42.71	42.46	. .						
− 6 21.58	− 0 25.21		. .						
		331 58 14.82	. .	.01	+ 0 0.71	1 44 59.98	+ 10 51 52.49	. .	. .
+ 5 18.19	0 25.80		. .						
0 0.00	− 0 0.24	0 15 16.08	61.99	.11	0 0.56	12 48 51.51	+ 39 8 53.34	8.71	−68.45
0 0.19	+ 1 35.90	52 36 61.45	. .						
0 0.08	1 16.32	61.02	. .						
0 0.08	1 13.77	59.63	. .	.11	0 3.87	13 3 33.58	+ 88 29 22.88	90.50	+74.65
0 0.09	1 16.21	59.18	. .						
0 0.20	+ 1 35.82	58.00	. .						
+ 0 0.01	− 1 5.57	310 44 46.12	. .	.11	0 0.83	13 17 8.18	− 10 21 36.62	9.71	−61.21
0 0.00	− 0 7.70	337 26 48.90	61.08	8.90	0 0.68	3 1 52.36	+ 16 20 27.07	. .	. .
0 0.00	+ 0 9.77	9 44 49.27	. .	.95	0 0.51	8 48 40.15	+ 48 38 27.44	14.56	52.61
0 0.00	− 0 21.62	359 11 33.38	. .	.96	+ 0 0.67	9 0 25.60	+ 18 5 11.55	11.66	43.98
0 0.00	− 1 0.70	313 6 24.70	. .	.96	− 0 7.99	9 20 2.93	− 7 59 57.13	9.89	39.73
0 0.00	+ 0 14.34	13 31 18.84	61.38	9.04	+ 0 0.48	17 26 59.63	+ 52 24 56.71	3.47	− 1.18
0 0.00	+ 0 13.24	12 30 45.10	. .	.04	0 0.49	17 53 3.76	+ 51 30 22.97	3.66	+ 7.54
0 0.00	− 1 42.87	300 0 53.91	. .	.05	0 0.92	18 4 35.53	− 21 5 28.22	11.89	− 4.93
. . .	. . .	. . . .	. .	.06	0 0.59	18 44 25.49	. . . .	7.16	+22.26
. . .	. . .	. . . .	. .	.06	0 0.73	19 43 17.66	. . . .	10.11	35.61
0 0.00	1 43.52		59.28	.25	0 0.79	23 7 13.62	− 4 20 45.60	. .	. .
− 0 32.41	0 44.10	316 45 34.43	. .						
0 0.01	− 0 10.85	349 20 44.46	. .	.26	+ 0 0.61	0 0 26.67	+ 28 14 23.21	+ 11.79	+80.76
0 0.20	+ 0 45.02	49 35 36.69	. .						
0 0.23	0 57.48	36.53	. .						
− 0 0.25	+ 1 4.74	36.46	. .						

NADIR POINTS. A.	B.	C.	D.	Means
	Apr.17	Night.		° ′
				179 59
61″0	65″0	65″5	60″6	63″02
60.0	64.0	64.0	59.4	61.85
62.0	65.4	66.0	61.0	63.60
59.5	63.2	63.4	59.0	61.27
59.5	63.2	63.4	59.0	61.22
59.6	63.3	63.5	59.1	61.37
60.2	64.3	63.5	59.7	61.93
59.0	63.0	64.0	59.8	61.45
59.4	63.0	64.4	59.8	61.65
59.2	62.8	64.2	59.6	61.45
59.94	63.72	64.19	59.70	61.89
	Apr.17	23.5*h.*		**179 59**
57.4	63.0	62.2	59.6	60.55
57.5	62.8	62.3	59.2	60.45
57.2	62.9	62.2	58.9	60.30
57.4	62.9	62.5	59.3	60.52
57.1	62.6	62.2	59.4	60.33
57.32	62.84	62.28	59.28	60.43
	Apr.18			**179 59**
57.5	63.9	64.4	60.7	61.37
57.5	64.0	64.5	60.8	61.70
57.3	64.0	64.0	61.0	61.58
57.0	63.9	64.5	60.5	61.47
57.3	64.0	64.1	60.7	61.78
57.32	63.96	64.30	60.74	61.58
	Apr.18			**179 59**
59.3	64.5	64.4	62.1	62.58
59.0	64.0	64.2	61.8	62.25
59.0	64.0	64.9	61.8	62.42
59.0	64.2	64.5	62.0	62.43
58.9	64.0	64.5	61.8	62.30
59.04	64.14	64.50	61.90	62.40
	Apr.19	8.7*h.*		**179 59**
59.0	65.9	63.0	58.0	61.47
58.8	65.5	62.5	57.5	61.08
59.5	66.1	63.3	59.1	62.00
57.0	64.2	62.1	58.1	60.35
57.1	64.1	62.0	58.8	60.50
58.28	65.16	62.58	58.30	61.08
	Apr.19	18*h.*		**179 59**
59.7	66.0	63.5	61.0	62.55
58.3	65.0	61.0	58.2	60.78
59.8	66.0	62.5	61.5	62.45
58.9	64.5	62.3	59.8	61.38
58.2	64.6	61.0	57.7	60.37
56.0	64.0	64.1	59.2	60.82
58.48	65.02	62.50	59.52	61.37

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Venus .	− 0 1.11	
Sun . .	. . . .	15 58.76
Jupiter .	+ 0 1.17	
Venus .	− 0 1.06	

Apr. 16. Error of Runs, +0″48.
" 17. do. do. +0.34.
" 18. do. do. −0.02. Mic. coincidence, 40*r*.072.
" 19. do. do. 0.000.
" 19, 23*h*., 30*m*. The Mechanic cleaned the instrument without raising it, but disturbed the Nadir Point.

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.	
			s.	s.	s.	s.	s.	s.	s.	h. m. s.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Apr. 19	1	Polaris				28.0				1 3 26.57	49 34 30.6	25.1	31.3	30.4	29.35	. .	30.492	61.8	67.3	H
	2						17.0				33.0	28.0	34.4	33.0	32.10	. .				
	3							18.0			40.3	34.4	43.2	41.0	39.73	. .				
	4								14.0		54.4	48.7	55.0	54.0	53.02	. .	30.488	62.2	67.0	
20	†5	Sun, 1st & N. L. (Mic. 3)	38.2	49.6	0.9	11.4	22.0	33.0	43.8	1 51 11.27	333 1 27.5	34.8	38.7	33.9	33.72*d*	40.753				
	†6	Sun, 2d & S. L. (Mic. 5)	48.0	59.2	10.0	21.2	32.3	43.8	55.2	1 53 21.39	332 17 55.0	63.9	65.1	59.2	60.80	40.753	30.482	63.0	69.3	
	†7	β Ursæ Minoris, S. P.	12.0	29.0	47.5	5.5	24.2	..	..	2 50 47.64	66 17 11.7	7.3	15.3	11.5	11.45	. .	30.456	64.4	69.8	
	8	α Hydræ, (Mic. 4.)	19.6	31.0	41.8	53.0	4.3	15.5	26.2	9 19 53.06	313 6 9.2	16.5	20.0	16.3	15.50	42.110	30.340	66.2	60.0	
	†9	μ¹ Sagittarii	50.0	1.8	13.2	25.2	37.0	49.0	1.0	18 4 25.31	300 2 25.2	31.9	38.6	33.2	32.22	. .	30.226	57.8	48.4	
	10	δ Ursæ Minoris	36.0	43.5	50.0	52.5	56.3	2.0	..	18 20 20.05	. . . .	..	..	..	. .	. .				
	†11	α Lyræ	53.0	7.0	21.5	35.0	49.2	3.0	17.0	18 31 35.10	. . . .	..	..	..	. .	. .				
	12	Venus, 2d and N. L.	32.5	43.6	54.5	5.8	16.8	27.7	38.7	23 10 5.66	316 56 17.0	24.0	26.3	22.8	22.52	. .	30.230	60.0	67.0	M
	†13	Polaris		36.0						1 6 52.92	49 34 44.0	39.0	48.0	43.0	43.50	. .	30.200	63.5	72.5	
	14				29.5						39.2	36.0	45.0	42.0	40.55	. .				
	15					26.0					34.4	31.2	40.0	35.2	40.20	. .				
	16						18.5				40.0	35.2	44.0	39.8	39.75	. .	31.200	65.0	74.0	
	17							15.5			46.7	42.1	51.4	47.0	46.80	. .				
	18								12.0		60.0	55.5	63.3	59.5	59.58	. .	30.190	66.0	76.0	
21	19	Sun, 1st L.	21.0	32.2	43.3	54.5	5.7	16.7	27.5	1 54 54.41	. . . .	..	..	..	. .	. .				
	20	Sextantis, 3492	46.5	58.0	8.7	19.5	30.7	42.0	53.0	10 6 19.77	313 52 60.0	66.7	70.2	57.2	64.02	. .	30.050	71.6	70.0	
	21	α Antliæ	20.5	33.3	45.6	58.0	11.4	24.0	36.6	10 19 58.49	290 52 4.8	10.2	15.5	7.6	9.52	. .	30.054	71.8	70.0	
	22	Leonis Minoris, 3728	53.4	6.9	20.2	33.5	46.5	0.5	13.5	10 44 33.50	356 8 50.3	55.9	56.5	52.0	53.68	. .	30.050	71.0	70.0	
	23	α Ursæ Majoris	1.8	26.0	49.5	13.8	36.9	0.8	24.6	10 54 3.34	23 40 46.2	45.0	51.0	44.7	46.72	. .	30.050	71.0	70.0	
	24	δ Leonis	11.5	23.5	35.1	46.5	58.5	10.5	22.5	11 5 46.87	342 28 20.2	28.5	31.3	28.5	27.12	. .	30.050			
	†25	δ Hydræ et Crateris	56.5	8.5	19.6	30.4	42.0	..	..	11 11 19.40	307 10 25.3	30.6	36.2	28.3	30.10	. .	30.050	70.8	69.5	
	26	γ Cephei, S. P.	29.2	16.8	5.5	53.8	40.4	38.3	16.9	11 32 52.99	64 18 6.9	2.4	10.3	2.3	5.48	. .	30.050	70.8	69.5	
	27	γ Ursæ Majoris	38.5	57.5	16.0	35.0	53.5	12.5	31.5	11 45 34.93	15 39 4.4	3.4	7.8	1.1	4.18	. .				
	28	ε Corvi	29.8	41.5	53.5	5.5	17.3	28.9	40.7	12 2 5.31	299 21 45.0	52.2	58.5	49.0	51.17	. .	30.040	70.5	67.8	
	29	Polaris, S. P.						24.0		13 3 15.16	52 35 37.5	34.0	41.0	35.0	36.88	. .				
	30						24.0				45.8	41.2	50.0	40.0	44.25	. .				
	31					13.0					47.8	45.1	51.0	44.0	46.98	. .	30.030	69.0	65.5	
	32				12.5						46.4	43.6	51.0	43.2	45.90	. .				
	33			2.0							44.2	37.2	44.5	35·2	40.28	. .				
	34	η Ursæ Majoris	29.5	46.5	3.6	20.7	37.5	54.9	11.9	13 41 20.66	11 11 3.2	3.2	7.8	2.2	4.10	. .	30.040	70.5	67.8	
	35	η Bootis	38.7	50.5	2.0	13.5	25.1	36.9	48.5	13 47 13.60	. . . .	..	..	..	. .	. .				
	†36	Venus, 2d and N. L.	36.0	46.9	57.7	8.8	20.0	31.0	42.1	23 13 8.93	317 6 35.3	44.8	48.7	43.2	43.00	. .	30.098	66.4	76.6	H.
	37	S. L. (Mic. 4.)	..	..	..	..	..	..	..		" " "	"	"	"	" "	39.100				
	†38	α Andromedæ, (Mic. 4.)	..	..	4.2	16.4	28.4	..	..	0 0 16.33	349 20 36.0	49.0	43.4	42.0	42.60	40.425	30.152	69.0	79.5	
22	39	Sun, 1st L.	4.9	16.1	27.2	38.8	50.0	1.2	12.5	1 58 38.67	. . . .	..	..	..	. .	. .				
	40	Sun, 2d L.	15.3	27.0	38.1	49.7	0.3	11.8	23.0	2 0 49.31	. . . .	..	..	..	. .	. .				
	†41	α Ursæ Majoris	51.5	15.8	39.2	3.0	26.8	50.6	14.3	10 54 3.03	23 40 42.9	39.7	47.5	41.9	43.00	. .	30.064	65.0	58.5	
	42	δ Leonis	11.2	23.2	35.0	46.2	58.2	10.0	22.0	11 5 46.54	342 28 19.1	25.2	28.2	23.8	24.08	. .	30.064	64.0	58.2	
	†43	δ Hydræ et Crateris	56.8	8.2	19.0	31.0	..	53.4	..	11 11 21.68	307 10 21.8	27.8	32.5	28.9	27.75	. .	30.064	64.0	58.0	
	44	β Leonis	30.0	41.3	52.5	4.2	15.2	27.0	38.2	11 41 4.06	336 32 22.4	31.2	32.0	27.5	28.28	. .				
	45	γ Ursæ Majoris	37.8	57.1	15.7	35.0	53.6	12.2	31.2	11 45 34.66	15 39 1.1	1.0	3.8	1.7	1.90	. .	30.052	62.5	57.0	
	46	β Corvi	..	..	..	10.6	22.2	34.4	46.1	12 26 28.33	298 35 2.0	8.1	14.2	8.0	8.08	. .	30.064	61.8	55.7	
	47	12 Canum Venat.	59.0	13.2	27.0	41.2	55.3	9.2	23.8	12 48 41.24	0 15 12.3	18.0	19.5	16.7	16.62	. .				
	48	Polaris, S. P.					14.0			13 3 15.67	52 35 39.8	36.9	47.1	41.0	41.20	. .				
	49					12.0					42.7	40.0	49.5	43.5	43.92	. .	30.050	60.3	54.7	
	50				21.0						40.2	37.5	47.3	39.0	41.00	. .				
	51	α Virginis	24.0	35.6	46.2	57.8	8.5	20.0	31.1	13 16 57.60	310 45 45.7	53.5	59.5	55.0	53.42	. .	30.050	59.8	54.5	
	†52	η Ursæ Majoris	29.0	46.0	3.1	20.4	37.1	54.2	11.4	13 41 20.17	11 10 59.0	61.0	64.8	62.0	61.70	. .	30.064	60.0	53.8	

DATE.	VALUE OF *m.*	*n.*	*c.*	CLOCK. At 12*h.*	H. Rate. 0*s.*
	s.	s.	s.	s.	
Apr. 20	+0.521	—0.342	+0.246	*s* 9.353	*l* .008
21	0.521	0.342	0.246	9.485	.007
22	+0.521	—0.342	+0.246	*s* 9.790	*l* .019

5 & 6. Sun well defined.
7, 9, 11 & 52. Very unsteady.
13. Cloudy at the first wire.
25. Lost the transit at wires VI and VII, in consequence of carriages passing by.
36. Faint, but steady; a thick sultry haze over the sky; cor. of S. Cusp. for def. illumination, —1″.11.
38. Very faint; observed for dec. after passing wire VII.
41. A thick haze covers the sky.
43. Exceedingly faint; observed through clouds.

No.	CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
	′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
	− 0+0.27	+ 1 7.13	49 35 36.21	60.51	+ 9.26	− 0 3.00	1 3 32.80	+ 88 29 15.38	+ 90.20	+75.07
	0 0.24	1 4.66	36.52	. .						
	0 0.23	0 57.12	36.62	. .						
	0 0.19	+ 0 44.63	37.46	. .						
	− 5 30.61	− 0 25.29	332 39 40.82	. .	.27	+ 0 0.84	1 52 26.44	+ 11 33 10.56	. .	. .
	+ 6 8.92	− 0 25.89		. .						
	− 0 0.11	+ 2 8.79	66 19 20.13	. .	.28	− 0 40.88	2 51 16.04	+ 74 47 1.13	− 4.51	−51.41
	+ 1 9.31	− 1 1.61	313 6 23.20	60.46	.33	+ 0 0.82	9 20 3.21	− 7 59 58.01	+ 9.91	39.74
	+ 0 0.07	1 40.77	300 0 51.52	61.44	.40	0 0.92	18 4 35.63	− 21 5 30.67	11.86	− 4.96
	. . .	. . .	. . . .	. .	.40	1 30.54	18 21 59.99	. . . .	. .	. .
	. . .	. . .	. . . .	. .	.41	0 0.56	18 31 45.07	. . . .	6.38	. .
	+ 0 0.10	− 0 57.61	316 55 25.01	64.05	.39	+ 0 0.79	23 10 14.79	− 4 11 0.21	. .	. .
	− 0 0.10	+ 0 55.64	49 35 39.04	. .						
	0 0.11	1 2.99	43.44	. .						
	0 0.11	1 5.25	45.34	. .	.41	− 3 31.13	1 3 31.20	+ 88 29 18.09	90.07	+75.36
	0 0.11	1 2.78	42.42	. .						
	0 0.10	0 56.65	43.35	. .						
	− 0 0.08	+ 0 44.24	43.74	. .						
	. . .	. . .	. . . .	. .	.42	+ 0 0.70	1 56 9.80	. . . .	. .	. .
	+ 0 0.14	− 0 58.26	313 52 5.90	60.46	.47	0 0.81	10 6 30.05	− 7 14 15.31	9.83	−53.78
	− 0 0.17	2 25.96	290 49 43.39	. .	.47	0 1.01	10 20 8.97	− 30 16 37.82	8.59	46.50
	− 0 0.02	− 0 3.69	356 8 49.97	. .	.48	0 0.58	10 44 43.56	+ 35 2 28.76	11.19	67.35
	+ 0 0.19	+ 0 24.61	23 41 11.52	. .	.48	0 0.40	10 54 13.22	+ 62 34 50.31	12.35	75.67
	− 0 0.22	− 0 17.74	342 28 9.60	. .	.48	0 0.65	11 5 57.00	+ 21 21 48.39	10.50	65.91
	0 0.22	− 1 13.91	307 9 15.97	. .	.48	0 12.15	11 11 41.03	− 13 57 5.24	9.46	−56.48
	0 0.01	+ 1 56.10	64 20 1.57	. .	.48	0 0.90	11 33 3.37	+ 76 46 19.64	10.61	+83.22
	0 0.01	+ 0 15.76	15 39 19.43	. .	.48	0 0.47	11 45 44.88	+ 54 32 58.72	10.13	−75.25
	− 0 0.13	− 1 39.72	299 20 11.22	. .	.49	0 0.92	12 2 15.72	− 21 46 9.89	9.78	−66.18
	+ 0 0.21	+ 1 23.93	52 36 61.02	. .						
	0 0.18	1 14.35	58.78	. .						
	0 0.18	1 13.84	61.00	. .	.49	0 4.52	13 3 29.17	+ 88 29 19.69	89.96	+75.51
	0 0.18	1 16.25	62.33	. .						
	+ 0 0.20	1 23.98	64.46	. .						
34	− 0 0.14	+ 0 11.12	11 11 15.08	. .	.49	0 0.49	13 41 30.64	+ 50 4 53.87	6.87	−64.43
35	. . .	. . .	. . . .	. .	.50	0 0.66	13 47 23.76	. . . .	8.82	−61.43
36	0 0.11	− 0 41.00	317 5 44.40	60.91	.54	0 0.79	23 13 18.23	− 4 0 37.26	. .	. .
37	− 0 33.97	0 42.11								
38	+ 0 11.84	− 0 10.39	349 20 44.05	. .	.56	0 0.61	0 0 26.50	+ 28 14 22.39	11.76	+80.85
39	. . .	. . .	. . . .	. .						
40	. . .	. . .	. . . .	. .	.60	0 0.70	1 59 54.29	. . . .	. .	. .
41	+ 0 0.20	+ 0 25.18	23 41 8.38	57.30	.77	0 0.40	10 54 13.20	+ 62 34 50.33	12.38	−75.85
42	− 0 0.21	− 0 18.14	342 28 5.73	. .	.78	0 0.65	11 5 56.97	+ 21 21 47.68	10.51	66.02
43	− 0 0.22	1 15.64	307 9 11.89	. .	.78	0 9.86	11 11 41.32	− 13 57 6.16	9.47	56.44
44	+ 0 0.23	− 0 24.98	336 32 3.52	. .	.79	0 0.68	11 41 14.53	+ 15 25 45.47	9.84	66.44
45	0 0.00	+ 0 16.13	15 39 17.87	. .	.79	+ 0 0.47	11 45 44.92	+ 54 33 0.15	10.15	75.68
46	+ 0 0.02	− 1 45.55	298 33 29.55	. .	.80	− 0 16.84	12 26 21.29	− 22 32 55.50	9.55	61.05
47	− 0 0.04	+ 0 0.24	0 15 16.82	. .	.80	+ 0 0.56	12 48 51.60	+ 39 8 58.76	8.73	69.35
48	+ 0 0.18	0 17.86	52 36 59.18	. .						
49	0 0.17	0 15.43	59.52	. .	.81	0 3.41	13 3 28.89	+ 88 29 18.76	89.72	75.85
50	+ 0 0.18	+ 0 17.95	59.13	. .						
51	− 0 0.13	− 1 7.01	310 44 46.28	. .	.81	0 0.84	13 17 8.25	− 10 21 31.77	9.69	61.10
52	+ 0 0.15	+ 0 11.46	11 11 13.31	. .	.82	+ 0 0.49	13 41 30.48	+ 50 4 55.26	+ 6.87	−64.71

NADIR POINTS. A.	B.	C.	D.	Means
	Apr.20	3h.		° ′ **179 59**
56″4	63″0	63″8	58″8	60″50
56.4	63.3	63.8	58.7	60.55
56.5	63.2	63.9	58.0	60.40
56.3	63.2	63.8	58.4	60.42
56.4	63.2	64.4	58.7	60.68
56.40	63.18	63.94	58.52	60.51
	Apr.20	9h.		**179 59**
56.5	63.0	64.5	59.0	60.75
56.2	63.2	64.5	58.5	60.60
55.8	62.5	64.1	58.3	60.18
56.4	62.8	64.1	58.5	60.45
55.9	62.5	64.5	58.5	60.35
56.16	62.80	64.30	58.56	60.46
	Apr.20	18h.		**179 59**
57.5	64.0	66.4	59.6	61.87
56.8	63.5	65.5	59.5	61.33
56.8	63.8	64.8	59.4	61.20
57.3	64.0	65.6	59.5	61.60
56.5	63.6	65.5	59.3	61.22
56.98	63.78	65.56	59.46	61.44
	Apr.20	0h.		**179 59**
61.2	66.6	67.0	62.3	64.27
61.8	66.9	66.7	59.9	63.82
61.50	66.75	66.85	61.10	64.05
	Apr.21	Night.		**179 59**
58.3	63.3	64.3	57.0	60.72
58.2	63.3	64.3	57.0	60.70
58.2	63.2	64.3	57.0	60.68
58.0	62.8	63.5	55.0	59.82
58.0	63.5	63.5	56.5	60.38
58.14	63.22	63.98	56.50	60.46
	Apr.21	23h.		**179 59**
56.5	63.0	64.5	59.2	60.80
56.5	62.4	65.4	59.4	60.92
56.3	62.5	65.0	59.3	60.77
56.5	62.8	65.3	59.4	61.00
56.6	62.8	65.4	59.5	61.07
56.48	62.70	65.12	59.36	60.91
	Apr.22	10h.		**179 59**
53.6	60.3	61.2	54.0	57.27
53.6	60.1	61.3	53.8	57.20
53.3	60.4	61.5	54.0	57.30
53.4	60.8	61.5	54.5	57.55
53.3	60.4	61.0	54.0	57.18
53.44	60.40	61.30	54.06	57.30

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Sun .	. . . .	15 57.00
Venus .	− 0 1.05	
Sun . .	+ 1 5.27	
Venus .	− 0 1.03	0 17.48

Apr. 20. Error of Runs −0″44. Mic. coincidence, 40r.093.
" 21. do. do. +0.45. do. do. 40r.091.
" 22. do. do. +0.45.

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	TH
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°
Apr. 22	†1	η Bootis	38.5	50.0	1.7	13.3	24.8	36.8	48.2	13 47 13.33	340 16 40.4	52.2	55.1	50.1	50.20	. .		
23	2							30.0			52 35 38.0	34.0	41.8	34.0	36.95	. .	29.906	65.
	3						26.0				43.4	38.4	47.0	39.0	41.70	. .		
	4					20.5				13 6 47.42	45.5	41.5	48.6	40.5	44.02	. .		65.
	5	Polaris, S. P. . .			13.0						44.0	40.0	46.5	40.0	42.62	. .		
	6			5.0							39.0	36.0	44.0	33.2	38.05	. .		
	7		10.0								22.2	19.0	25.5	14.0	20.18	. .	29.960	65.
	†8	η Ursæ Majoris . . .	29.0	46.7	3.0	20.4	37.2	54.5	11.5	13 41 20.26	11 10 61.3	61.2	65.8	57.2	61.62	. .	29.900	64.
	9	η Bootis	38.5	50.3	1.5	13.4	24.9	36.4	48.1	13 47 13.30	340 16 41.6	50.4	52.2	39.2	45.85	. .		64.
	10	α Bootis	55.3	7.1	18.7	30.3	42.0	53.5	5.5	14 8 30.34	341 5 34.3	40.3	45.0	34.2	38.45	. .	29.900	64.
24	11	α Bootis	54.8	6.8	18.0	29.6	41.2	3.0	14.2	14 8 29.66	341 5 34.0	42.5	47.0	40.1	40.90	. .	29.770	71.
	12	ε Bootis	30.0	42.4	54.5	7.2	19.5	32.0	44.5	14 38 7.14	348 49 51.3	59.2	61.2	58.5	57.55	. .		
	13	α^2 Libræ	39.6	51.6	2.4	13.7	25.0	36.4	47.5	14 42 13.74	305 43 28.9	35.5	43.1	36.5	36.00*d*	. .	30.766	70.
	14	β Ursæ Minoris . . .	59.8	43.0	25.8	6.0	47.0	29.2	10.7	14 51 5.93	35 52 36.4	35.4	43.1	39.8	38.68*d*	. .	30.766	70.
	†15	α Cor. Bor.	24.5	37.0	49.5	..	13.8	26.2	38.3	15 28 1.52	348 20 28.7	36.2	38.8	34.5	34.55	. .	30.758	69.
	†16	α Serpentis	59.4	..	..	..	..	55.0	5.5	15 36 39.96	328 1 30.8	41.6	44.8	38.9	39.27*d*	. .	30.756	69.
	17	ζ Ursæ Minoris . . .	52.0	46.5	41.0	34.0	27.2	22.5	15.8	15 49 34.14	39 21 18.7	18.5	24.1	21.6	20.72	. .	30.750	69.
	18	δ Ophiuchi	35.5	47.0	57.4	8.8	19.4	30.0	41.2	16 6 8.47	. . . .	..	..	..	. .	. .		
	19	η Draconis, (ref.) . .	37.8	1.4	24.1	47.5	10.8	34.2	57.2	16 21 47.57	157 2 16.2	23.7	23.2	20.5	20.90	. .	30.756	69.
	20	α Herculis	55.0	6.2	17.0	29.0	40.2	51.2	2.4	17 7 28.71	335 40 45.3	54.6	56.8	52.7	52.35*d*	. .	30.712	68.
	21	α Ophiuchi	4.4	16.0	26.5	38.2	49.2	0.5	12.0	17 27 38.11	333 47 13.0	23.1	22.4	20.0	19.62	. .	30.764	68.
	22	γ Draconis, (ref.) . .	1.0	18.8	26.2	54.0	11.0	28.4	46.4	17 52 53.69	167 23 24.0	28.3	28.8	27.1	27.05	. .	29.762	68.
	23	μ^1 Sagittarii	49.2	1.2	12.5	24.3	35.8	47.5	59.2	18 4 24.24	. . . .	..	..	..	. .	. .		
	24		40.5								47 40 58.7	56.8	64.5	59.8	59.95	. .		
	25			46.0							52.8	50.0	59.0	54.0	53.95	. .		
	26	δ Ursæ Minoris . .			49.5					18 20 21.50	50.4	47.0	56.1	50.8	51.08	. .	29.770	63.
	27					54.0					50.0	46.5	56.0	50.3	50.70	. .		
	28						56.0				50.5	47.4	57.2	51.7	51.70	. .		
	29							3.0			54.4	51.2	60.4	54.6	55.15	. .		
	†30	α Lyræ	52.2	6.2	20.2	34.3	48.2	2.5	16.4	18 31 34.29	359 44 44.1	52.0	53.8	50.5	50.10	. .		
25	†31	Sun, 1st L.	19.5	31.0	42.0	54.0	5.0	..	27.0	2 9 49.75	334 30 19.5	27.2	28.2	23.4	24.58	. .		
	†32	1st Cusp. (Mic. 2). .	39.0	50.6	2.4	..	25.8	36.8	48.0	2 10 13 77	" " "	"	"	"	" "	43.350		
	33	Sun, N. L. (Mic. 5) .	..	..	..	..	..	..	..	. . . . .	334 30 19.3	27.8	28.2	24.8	25.02	40.300	29.848	75.1
	†34	2d Cusp.	30.5	..	52.8	4.1	16.0	26.5	38.0	2 11 7.98	. . . .	..	..	..	. .	. .		
	†35		35.0								49 34 51.0	48.5	50.8	51.1	50.35	. .	29.960	57.0
	36			35.0							39.0	36.5	39.8	39.5	38.70	. .		
	37				29.0						30.1	27.9	29.8	29.5	29.32	. .		
26	38	Polaris				26.0				1 3 24.07	29.3	26.1	29.0	27.6	28.00	. .	29.956	57.8
	39						15.0				31.1	28.8	31.5	31.0	30.60	. .		
	40							16.5			38.9	36.1	39.8	39.1	38.48	. .		
	†41								12.0		50.8	49.2	52.0	51.4	50.85	. .		58.2
27	†42	α Ursæ Majoris . . .	0.5	14.5	37.8	2.0	25.6	49.0	13.0	10 54 1.77	23 40 46.0	45.9	52.0	48.0	47.97	. .	29.914	61.2
	43	δ Leonis	10.0	22.0	33.5	45.0	56.8	8.9	20.6	11 5 45.26	342 28 18.9	27.0	29.0	21.0	24.72	. .	29.914	61.2
	44	γ Cephei, S. P. . .	27.6	15.6	3.6	51.0	39.1	26.0	15.2	11 32 51.16	64 17 64.0	58.5	67.5	60.0	62.50	. .	29.910	60.0
	†45								35.5		52 35 22.7	19.5	28.5	20.0	22.64	. .	29.910	59.5
	46							27.0			31.7	26.7	37.6	31.0	31.75	. .		
	47	Polaris, S. P. . .				13.5				13 4 26.92	42.1	38.4	48.8	41.2	42.63	. .	29.910	59.0
	48				13.5						39.0	36.6	45.5	37.6	39.67	. .		
	49			3.5							32.0	28.5	38.5	30.5	32.38	. .		
	†50		8.5								20.5	16.4	25.3	26.6	22.20	. .	29.910	57.5
	51	η Ursæ Majoris . . .	27.8	45.0	2.0	19.0	36.0	53.0	10.2	13 41 19.00	11 10 60.0	60.4	65.0	59.0	61.10	. .	29.920	56.2
	†52	α Bootis	54.0	6.0	17.5	29.0	40.9	52.5	4.4	14 8 29.19	341 5 35.8	41.8	48.0	38.5	41.02	. .	29.920	56.0

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	*n.*	*c.*	At 12*h.*	0*s.*
	s.	s.	s.	s.	
Apr. 23	+0.521	—0.342	+0.246	*s* 9.530	*l* .030
24	.521	.342	.246	10.410	.025
27	+0.521	—0.342	+0.246	*s* 11.051	*l* .028

1. Unsteady.
8. Atmosphere very unfavorable for observing.
15. Observed through clouds, very steady.
16. Observed through clouds.
30. Very unsteady, and ill defined.
31 to 34. Sun eclipsed.
32. Unclamped and clamped again, but without moving the telescope.
35 to 41. Very unsteady.
42 to 52. Nadir point for these observations doubtful.
45 to 50. Badly defined, and very unsteady.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.17	− 0 20.77	340 16 29.60	. .	+ 9.82	+ 0 0.66	13 47 23.81	+ 19 10 11.55	+ 8.82	−61.59
0 0.00	+ 1 24.27	52 36 61.22	. .						
0 0.00	1 16.78	58.48	. .						
0 0.00	1 14.33	58.33	57.14	.56	− 3 23.84	13 3 33.14	+ 88 29 18.50	89.42	+76.17
0 0.00	1 16.74	59.36	. .						
0 0.00	1 24.04	62.09	. .						
0 0.00	1 36.69	56.87	. .						
0 0.12	+ 0 11.26	11 12 12.50	. .	.58	+ 0 0.49	13 41 30.33	+ 50 4 54.61	6.87	−64.98
0 0.15	− 0 20.41	340 16 25.59	. .	.58	0 0.66	13 47 23.54	+ 19 10 7.70	8.82	61.74
0 0.04	0 19.50	341 5 18.90	. .	.59	0 0.66	14 8 40.59	+ 19 59 1.10	8.34	64.55
0 0.02	0 19.13	341 5 21.79	59.94	10.47	0 0.66	14 8 40.79	+ 19 59 1.10	8.33	64.71
0 0.08	0 11.07	348 49 46.56	. .	.47	0 0.62	14 38 18.23	+ 27 43 25.87	7.92	52.32
0 0.00	− 1 17.91	305 42 18.09	. .	.47	0 0.87	14 42 25.08	− 15 24 2.60	10.14	51.94
0 0.00	+ 0 39.07	35 53 17.75	. .	.48	0 0.20	14 51 16.61	+ 74 46 57.06	4.57	52.86
+ 0 0.03	− 0 11.56	348 20 23.02	. .	.48	+ 0 0.62	15 28 12.62	+ 27 14 2.33	7.64	40.79
0 0.00	− 0 35.03	328 1 4.24	. .	.48	− 0 7.06	15 36 43.38	+ 6 54 43.55	9.12	39.28
− 0 0.02	+ 0 46.02	39 22 6.72	. .	.49	+ 0 0.09	15 49 44.72	+ 78 15 46.03	12.85	35.88
. . .	. . .	. . . .	. .	.49	+ 0 0.79	16 6 19.75	. . . .	9.79	. .
+ 0 0.05	− 0 22.70	157 1 58.25	. .	.50	− 0 0.34	16 21 57.73	+ 61 51 40.94	0.76	24.38
− 0 0.02	0 25.42	335 40 26.95	. .	.52	+ 0 0.68	17 7 39.91	+ 14 34 6.26	8.57	13.27
+ 0 0.05	0 27.75	253 46 51.92	. .	.52	+ 0 0.70	17 27 49.33	+ 12 40 31.23	8.81	− 8.11
0 0.04	− 0 12.60	167 23 14.49	. .	.53	− 0 0.11	17 53 4.11	+ 51 30 24.70	3.60	+ 6.43
. . .	. . .	. . . .	. .	.54	+ 0 0.92	18 4 35.70	. . . .	+ 11.75	. .
0 0.08	+ 0 52.17	47 41 52.20	. .						
0 0.09	0 57.85	51.89	. .						
0 0.09	1 0.99	52.16	. .	.55	1 30.76	18 22 2.81	+ 86 35 31.77	− 79.73	16.33
0 0.10	1 2.07	52.87	. .						
0 0.09	1 0.98	52.77	. .						
0 0.08	+ 0 57.63	52.86	. .						
0 0.01	− 0 0.25	359 44 49.86	. .	.55	0 0.56	18 31 45.40	+ 38 38 29.17	+ 6.24	19.41
. . .	. . .	. . . .	60.92	.75	+ 0 4.44	2 11 10.48	. . . .	. .	. .
+ 5 58.66	−16 18.68	334 20 5.00	. .	. .	. . .	. . . .	+ 13 13 43.33	. .	. .
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
− 0 0.36	+ 0 44.37	49 35 34.36	. .						
0 0.44	0 56.89	35.15	. .						
0 0.49	1 4.34	33.17	. .						
0 0.50	1 6.99	34.19	58.62	10.74	− 0 2.95	1 3 31.86	+ 88 29 14.96	87.94	+77.22
0 0.48	1 4.20	34.32	. .						
0 0.44	0 56.63	34.67	. .						
− 0 0.36	0 44.19	34.68	. .						
+ 0 0.25	+ 0 25.12	23 41 13.34	. .	11.02	+ 0 0.40	10 54 13.19	+ 62 34 53.97	12.53	−76.80
0 0.22	− 0 18.09	342 28 6.85	. .	.02	0 0.65	11 5 56.93	+ 21 21 47.48	10.57	−66.56
0 0.00	+ 1 59.09	64 20 1.59	. .	.04	+ 0 0.73	11 33 2.93	+ 76 46 17.88	10.18	+85.64
0 0.33	1 37.90	52 36 60.87	. .						
0 0.25	1 25.61	57.61	. .						
0 0.14	1 15.70	58.47	. .						
0 0.18	1 18.11	57.96	. .	.08	− 1 3.83	13 3 34.17	+ 88 29 20.37	87.71	+77.35
0 0.23	1 25.67	58.28	. .						
+ 0 0.33	+ 1 38.17	60.70	. .						
− 0 0.15	− 0 11.48	11 11 14.11	. .	.10	+ 0 0.49	13 41 30.59	+ 50 4 53.36	6.88	−66.09
− 0 0.05	− 0 19.96	341 5 21.01	. .	.11	+ 0 0.64	14 8 40.94	+ 19 59 0.44	+ 8.32	−65.17

NADIR POINTS.				
A.	B.	C.	D.	Means
	Apr.23	Night.		° ′
				179 59
56″0	62″1	61″2	51″6	57″74
55.0	61.0	60.7	51.5	57.05
55.0	60.6	60.8	51.0	56.85
55.0	61.0	61.2	50.0	56.80
55.0	61.5	61.2	51.3	57.30
55.20	61.24	61.02	51.08	57.14
	Apr.24	14*h*.		**179 59**
55.5	63.0	64.2	57.6	60.07
55.5	63.2	64.6	57.8	60.28
55.4	63.0	64.5	57.8	60.17
55.0	62.8	64.0	57.8	59.90
55.0	63.1	64.5	57.8	60.10
55.28	63.02	64.36	57.76	60.10
	Apr.24	17.7*h*.		**179 59**
55.2	62.5	62.5	58.1	59.82
55.2	62.8	63.5	57.9	59.85
55.3	62.5	63.2	57.6	59.65
55.2	62.5	63.6	57.9	59.80
55.3	62.5	63.0	58.1	59.73
55.24	62.56	63.36	57.92	59.77
	Apr.24	1.5*h*.		**179 59**
56.1	63.5	65.1	59.2	60.97
57.2	64.0	65.5	59.5	61.55
56.9	63.4	65.2	59.6	61.27
56.4	62.9	65.6	59.3	61.05
55.9	63.0	64.6	59.3	60.70
54.5	62.0	64.4	58.8	59.92
56.0	63.0	64.8	59.3	60.77
55.5	62.9	64.6	59.0	60.50
56.2	63.4	65.3	59.2	61.02
56.0	63.3	65.2	59.2	60.92
56.07	63.14	65.03	59.24	60.87
	Apr.25	2.5*h*.		**179 59**
56.3	63.8	65.3	59.2	61.15
56.3	63.8	65.4	58.7	61.05
56.3	63.9	65.3	59.2	61.17
56.6	63.5	65.3	59.2	61.15
55.5	63.0	65.0	58.8	60.57
56.20	63.60	65.26	59.02	61.02
	Apr.26	Day.		**179 59**
56.0	61.1	62.1	57.0	59.05
55.5	60.4	61.8	57.0	58.55
55.0	61.0	61.8	56.5	58.57
55.5	60.6	62.0	57.0	58.78
55.0	60.4	61.2	55.5	58.02
55.40	60.70	61.78	56.60	58.62

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Sun . .	+ 1 5.54	

Apr. 23. Error of Runs +0″35.
" 24. do. do. +0.24; Mic. coincidence, 40*r*.004.
" 25. do. do. —0.05; do. 40*r*.016.
" 26. do. do. 1.00.
" 27. do. do. —0.45.
" 27. At 0*h*. adjusted the instrument in azimuth.

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THI At.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°
Apr. 29	1			9.0							49 34 44.2	38.4	46.1	41.5	42.55	. .	29.748	61.2
	2				2.0						35.5	29.8	36.8	33.7	33.95	. .		
	3	Polaris					52.0			1 7 6.60	36.5	31.0	37.8	34.8	35.02	. .		
	4							48.0			43.2	37.5	46.7	42.2	42.40	. .		
	5								42.0		55.9	49.6	57.0	53.9	54.10	. .	29.744	62.0
30	6	Sun, 1st & N. L. (Mic.6)	12.0	23.0	34.8	46.1	37.1	9.0	20.1	2 28 46.01	335 56 57.1	65.8	68.2	58.3	62.35	39.162	29.646	64.0
	7	Sun, 2d & S. L. (Mic.2)	24.0	35.8	46.5	58.2	9.2	20.8	32.1	2 30 58.09	" " "	"	"	"	"	34.522	29.784	64.2
	8	α Aurigæ	18.6	34.2	49.6	5.8	21.2	37.0	53.0	5 5 5.63	6 56 15.4	17.9	22.8	16.2	18.07	. .	29.664	68.0
	9	δ Orionis	22.3	33.3	44.1	55.2	6.0	17.0	27.2	5 23 55.01	320 41 45.1	55.2	56.0	48.0	51.07	. .		
	10	ε Orionis	38.0	48.8	59.5	10.8	21.8	32.5	43.5	5 28 10.70	319 48 35.0	41.4	47.5	39.4	40.82	. .	39.648	68.4
	11	κ Orionis	40.2	51.8	3.0	14.0	24.8	36.1	47.2	5 40 13.87	311 23 22.2	28.0	30.4	24.4	26.25	. .	29.644	68.8
	12		6.0								49 34 54.2	48.6	54.8	50.0	51.90	. .		
	13			10.0							41.1	35.3	43.5	38.0	39.48	. .		
	14	Polaris			1.0					0 56 1.00	33.0	27.0	33.0	29.5	30.63	. .	29.640	65.5
	15										31.8	25.6	31.2	27.8	29.10	. .		
	16							47.0			40.3	35.2	42.5	37.3	38.82	. .		
May 1	17	Sun, 1st & N. L. (Mic.5)	..	..	22.8	33.8	45.0	56.2	7.9	2 32 45.14	336 22 35.2	45.0	47.3	38.6	41.55	41.316	29.620	
	18	Sun, 2d & S. L. (Mic.3)	11.2	23.0	34.0	45.7	57.0	8.5	19.6	2 34 45.57	336 2 27.6	35.8	38.3	30.5	33.05	41.316	29.620	67.7
	19	β Ursæ Minoris, S. P. .	..	27.0	45.5	4.0	22.3	40.5	58.5	2 50 42.97	66 17 18.0	13.3	19.6	13.5	16.10	. .	29.610	68.2
2	20	Sun, 1st & N. L. (Mic.6)	47.8	59.2	10.4	22.1	33.0	44.8	56.0	2 36 21.90	336 31 31.3	38.2	41.7	32.6	35.94*d*	42.088		
	†21	Sun, 2d & S. L. (Mic.2)	0.0	11.8	23.0	34.0	45.5	57.0	8.0	2 38 34.19	" " "	"	"	"	"	37.295	29.716	62.0
	†22	α Ursæ Majoris, (Mic. 4.)	44.0	8.5	31.8	55.5	19.0	43.2	6.8	10 53 55.54	23 37 34.1	31.9	38.0	32.7	34.21*d*	45.642	29.786	63.8
	†23	δ Leonis	5.2	17.0	29.0	40.5	..	4.0	15.8	11 5 38.58	342 28 21.4	28.0	19.2	26.1	26.21*d*	. .	29.786	64.0
	†24	δ Hydræ et Crat. . .	..	..	14.0	25.2	36.1	47.4	59.0	11 11 36.34	307 10 20.9	26.4	31.3	26.1	26.27*d*	. .	29.790	
	†25	Anon., S.P. (Mic. 5) .	1.0	36.1	12.5	47.8	24.0	59.0	34.3	11 40 47.81	77 35 28.0	27.5	33.0	25.8	28.58	46.265		
	†26	Anon., S.P. (Mic. 6) .	28.0	3.0	39.4	15.0	51.2	26.5	1.8	11 43 14.99	" " "	"	"	"	"	47.760	29.794	63.0
	27	12 Can. Venat. . . .	52.4	6.5	21.0	35.2	49.0	3.2	17.1	12 48 34.91	0 15 12.6	18.1	18.6	15.5	16.20	. .		
	28								1.0		52 35 25.9	22.6	30.4	24.3	25.80	. .		
	29						52.0				43.9	40.6	49.8	41.7	44.00	. .		
	30	Polaris, S. P. . .				42.0				13 3 45.40	45.4	42.2	51.3	44.7	45.90	. .	29.790	62.0
	31				57.0						41.6	38.5	48.0	40.4	42.12	. .		
	32		35.0								21.1	17.5	25.4	19.8	20.95	. .		
	†33	α Virginis.	18.4	29.0	40.0	51.5	3.0	14.2	25.2	13 16 51.61	310 45 44.4	51.4	56.0	51.7	50.87	. .		
	34	η Ursæ Majoris, (Mic. 4)	22.4	89.4	56.5	14.0	30.3	48.0	4.2	13 41 13.54	11 10 38.8	38.7	43.3	39.0	39.95	40.794	29.794	62.0
	†35	α Bootis	49.5	1.3	13.0	24.8	36.0	47.8	59.2	14 8 24.51	341 5 35.0	41.0	46.0	38.2	40.05	. .	29.770	61.0
3	36	Moon, 1st and N. L. .	15.5	27.1	38.5	49.5	0.9	12.5	23.4	9 15 49.63	331 17 53.9	58.8	59.3	50.6	55.65	. .	29.970	68.0
	†37	ε Leonis	..	27.0	39.0	51.0	3.3	15.5	..	9 36 51.16	345 35 15.0	17.1	21.1	10.4	15.90	. .	29.970	67.5
	38	α Leonis	21.3	32.4	43.9	54.5	6.3	17.5	28.9	9 59 54.97	. . . .	..	..	..	. .	. .		
	39	Leonis Minoris, 3640 .	8.2	21.5	34.1	47.0	0.2	13.3	26.5	10 29 47.26	353 52 42.0	48.8	49.3	39.5	44.90	. .	29.980	67.0
	40	α Ursæ Majoris . . .	43.0	7.3	30.8	54.8	18.4	42.0	6.3	10 53 54.66	23 40 45.5	42.8	50.1	41.0	44.85	. .	29.980	66.5
	41	δ Leonis	4.5	16.5	28.0	39.8	51.5	3.5	15.5	11 5 39.90	342 28 23.5	31.2	31.4	22.5	27.15	. .	29.980	66.0
	42	δ Hydræ et Crat. . .	50.5	1.9	13.1	24.5	35.8	47.0	58.1	11 11 24.41	307 10 23.0	28.5	32.6	22.5	26.65	. .	29.980	65.2
	43	γ Cephei, S. P. . . .	..	..	3.4	51.5	38.0	25.7	..	11 33 14.65	64 17 66.5	61.8	69.6	57.6	63.87	. .	29.980	65.2
	44	β Leonis	23.3	34.1	46.0	57.5	8.9	20.3	31.4	11 40 57.40	336 32 27.2	33.5	33.5	25.8	30.50	. .	29.980	65.2
	†45	α Virginis.	18.0	29.4	40.3	50.9	1.6	13.5	24.8	13 16 51.21	. . . .	..	..	..	. .	. .		
	†46	β Ursæ Minoris . . .	..	33.5	15.1	57.0	38.1	20.6	..	14 50 56.86	35 52 39.0	37.4	42.5	34.5	38.35	. .	30.000	62.0
	†47	β Libræ	56.5	7.6	18.7	29.8	40.9	52.0	3.0	15 8 29.79	312 18 32.0	28.8	43.5	29.5	35.95	. .	30.000	62.0
	†48	α Cor. Bor.	18.4	30.5	43.1	55.5	7.9	20.5	32.5	15 27 55.49	348 20 32.0	37.3	40.3	27.0	34.15	. .	30.000	61.5
	49	Venus, 2d and N. L. .	11.4	22.6	33.0	43.8	55.0	6.2	17.2	23 52 44.17	319 49 28.1	35.4	38.6	26.2	32.11	. .	30.108	62.0
	†50	Venus, S. L. (Mic. 4)	..	..	..	..	..	..	..	. . .	" " "	"	"	"	"	39.310		
	51	α Andromedæ . . .	32.4	45.0	57.1	10.0	22.1	34.2	47.0	0 0 9.69	349 20 50.2	59.0	57.1	46.8	52.78	. .	30.112	63.3
	52	Polaris	6.0								49 34 51.0	46.2	54.2	45.9	49.32	. .		

DATE.	VALUE OF *m.*	*n.*	*c.*	CLOCK. At 13*h.*	H. Rate. 0*s.*
	s.	s.	s.	s.	
Apr. 30	+0.590	+0.458	+0.207	*s* 13.368	*l* .030
May 2	0.590	0.458	0.207	15.417	.031
3	+0.590	+0.458	+0.207	*s* 16.149	*l* .034

21. A carriage passing by rendered clock beat inaudible.
22. Quite unsteady.
23, 24, 33 & 35. Readings of microscope D. very uncertain.
25 & 26. Stars observed with the Comet of June, 1846.
37, 45. Observed through clouds, at times entirely obscured.
46. Steady, but badly defined.
47. Steady, but badly defined.
48. Unsteady.
50. Correction of S. Cusp. for defective illumination, —0″.94.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.36	+ 0 55.30	49 35 38.21	. .						
0 0.40	1 2.96	37.31	. .						
0 0.39	1 3.53	38.94	62.88	+ 13.04	− 3 44.34	1 3 35.30	+ 88 29 14.17	+ 86.61	+77.97
0 0.36	0 56.22	38.09	. .						
0 0.30	+ 0 44.17	38.57	. .						
+13 58.92	− 0 21.02	335 54 46.98	. .	.10	+ 0 0.93	2 30 6.08	+ 14 48 23.55	. .	. .
−17 47.11	− 0 21.53		. .						
+ 0 0.07	+ 0 6.66	6 56 24.80	. .	.16	0 1.36	5 5 20.15	+ 45 50 1.17	16.83	18.56
+ 0 0.02	− 0 44.79	320 41 6.30	. .	.17	0 0.79	5 24 8.97	− 0 25 17.33	11.70	24.23
− 0 0.03	1 2.06	319 47 54.59	. .	.17	0 0.79	5 28 24.66	− 1 18 29.04	11.61	23.25
+ 0 0.04	− 1 2.06	311 22 24.23	. .	.18	0 0.72	5 40 27.77	− 9 43 59.40	10.88	21.56
0 0.13	+ 0 41.67	49 35 33.70	. .						
0 0.16	0 54.62	34.26	. .						
0 0.18	1 2.24	33.05	60.17	.77	+ 7 20.40	1 3 35.17	+ 88 29 12.96	+ 86.22	+84.37
0 0.18	1 4.17	33.99	. .						
0 0.16	+ 0 55.44	34.42	. .						
+ 6 29.78	− 0 20.27	336 12 56.68	. .	.81	− 0 10.98 + 0 0.93	2 33 54.44	+ 15 6 35.76	. .	. .
− 5 9.94	− 0 20.81		. .						
+ 0 0.02	+ 2 3.12	66 19 19.24	. .	.81	0 19.01	2 51 15.73	+ 74 47 1.68	− 4.61	−54.97
+15 35.94	− 0 20.65	336 30 55.23	58.14	15.10	0 0.93	2 37 44.12	+ 15 24 36.24	. .	. .
−16 15.35	− 0 21.35								
+ 3 9.78	+ 0 25.01	23 41 9.00	58.32	.35	0 1.92	10 54 12.81	+ 62 34 49.93	+ 12.70	77.62
− 0 0.01	− 0 17.97	342 28 8.23	. .	.36	+ 0 2.93	11 5 56.87	+ 21 21 49.16	10.62	67.11
− 0 0.01	− 1 14.95	307 9 12.99	. .	.36	− 0 10.58	11 11 41.12	+ 13 57 6.08	9.57	−56.20
+ 9 17.74	+ 4 15.88	77 49 2.20	. .	.36	0 0.78	11 41 2.39	+ 63 17 16.87	10.74	+84.92
+18 51.24	4 19.21	77 58 39.12	. .	.36	− 0 0.78	11 43 29.57	+ 63 7 39.95	10.97	+84.93
− 0 0.03	0 0.24	0 15 16.41	. .	.41	+ 0 1.23	12 48 51.55	+ 39 8 57.34	8.79	−71.56
+ 0 0.11	1 35.98	52 36 61.89	. .						
0 0.05	1 16.79	60.84	. .						
0 0.05	1 14.59	60.54	. .	.42	− 0 25.70	13 3 35.12	+ 88 29 18.68	85.70	+78.59
0 0.05	1 17.41	59.58	. .						
+ 0 0.14	+ 1 38.02	59.11	. .						
− 0 0.11	− 1 6.27	310 44 44.49	. .	.42	+ 0 0.72	13 17 7.75	− 10 21 34.58	9.68	−60.99
+ 0 20.16	+ 0 11.31	11 11 11.42	. .	.43	0 1.46	13 41 30.43	+ 50 4 52.35	6.89	67.47
0 0.04	− 0 19.59	341 5 20.53	. .	.45	0 0.98	14 8 40.94	+ 19 59 1.43	8.30	65.99
+ 0 0.01	+10 34.23	331 29 10.58	59.69	16.07	0 0.88	9 17 8.79	+ 10 22 9.45	. .	. .
− 0 0.10	− 0 14.49	345 35 15.90	. .	.08	0 1.12	9 37 8.36	+ 24 28 40.87	11.82	55.11
. . .	. . .	. . . .	. .	.09	0 0.90	10 0 11.96	. . . .	10.90	. .
0 0.17	− 0 6.07	353 52 38.66	. .	.10	0 1.13	10 30 4.49	+ 32 46 18.22	11.54	66.48
− 0 0.17	+ 0 24.90	23 41 9.58	. .	.11	0 1.92	10 54 12.69	+ 62 34 49.14	12.74	77.77
+ 0 0.19	− 0 17.98	342 28 9.36	. .	.12	0 0.89	11 5 56.91	+ 21 21 48.92	10.64	67.21
0 0.19	+ 1 15.20	307 9 11.64	. .	.13	+ 0 0.69	11 11 41.23	− 13 57 8.80	9.58	−56.20
+ 0 0.01	+ 1 58.12	64 20 2.00	. .	.14	− 0 26.13	11 33 4.66	+ 76 46 18.44	9.69	+85.41
− 0 0.06	− 0 24.79	336 32 5.75	. .	.14	+ 0 0.93	11 41 14.47	+ 15 25 45.31	9.92	−67.54
. . .	. . .	. . . .	. .	.16	0 0.72	13 17 8.09	. . . .	+ 9.68	60.98
+ 0 0.22	+ 0 41.55	35 53 20.12	. .	.21	0 3.37	14 51 16.44	+ 74 46 59.68	− 4.61	55.78
+ 0 0.08	+ 1 3.03	312 17 33.00	. .	.22	0 0.73	15 8 46.74	− 8 48 47.44	+ 9.83	47.02
− 0 0.05	− 0 11.78	348 20 22.32	. .	.23	0 1.06	15 28 12.78	+ 27 14 1.88	7.53	−42.69
+ 0 0.01	0 38.85	319 48 38.68	57.59	.13	0 0.81	23 53 0.24	+ 1 17 39.67	. .	. .
− 0 28.21	0 38.88								
0 0.03	− 0 10.61	349 20 42.14	. .	.13	+ 0 1.07	0 0 26.89	+ 28 14 23.80	+ 11.48	+80.95
− 0 0.17	+ 0 42.72	49 35 31.87	. .						

NADIR POINTS.				
A.	B.	C.	D.	Means
				° ′
	Apr.30			**179 59**
59″7	65″8	66″5	60″3	63″07
59.7	65.8	66.5	60.3	63.08
59.3	65.0	66.5	60.2	62.75
59.3	65.6	66.2	60.2	62.83
59.5	65.0	66.2	60.1	62.70
59.50	65.44	66.38	60.22	62.88
	May 1			**179 59**
56.8	62.9	63.1	57.5	60.08
57.0	62.7	63.4	58.0	60.27
56.6	62.8	63.6	58.0	60.25
56.5	62.4	63.1	58.2	60.05
56.8	62.8	63.2	58.0	60.20
56.74	62.72	63.28	57.94	60.17
	May 2	Day.		**179 59**
54.4	60.5	61.6	56.5	58.25
54.4	60.3	61.4	56.5	58.07
54.1	60.3	62.0	56.4	58.20
54.3	60.3	61.2	56.8	58.15
54.2	60.3	61.2	56.5	58.05
54.28	60.34	61.42	56.54	58.14
	May 2	Night.		**179 59**
54.0	61.0	61.9	57.4	58.57
54.0	60.5	61.0	57.1	58.15
54.4	60.5	61.6	57.5	58.56
54.1	60.5	61.0	57.0	58.15
54.0	60.5	61.6	56.8	58.23
54.10	60.60	61.42	57.16	58.32
	May 3	Night.		**179 59**
57.3	62.2	62.5	55.2	59.30
58.0	62.4	63.1	56.5	60.00
58.4	63.2	63.4	55.5	60.12
57.8	62.7	63.3	55.0	59.70
57.3	62.2	63.1	54.8	59.35
57.76	62.54	63.08	55.40	59.69
	May 3	23*h*.		**179 59**
54.8	61.2	62.5	52.5	57.75
55.2	60.7	62.3	52.4	57.45
55.0	60.4	62.0	52.7	57.52
54.5	60.6	61.8	53.1	57.50
54.9	60.8	61.8	52.7	57.55
54.88	60.74	62.08	52.68	57.59

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Sun . .	. . . . .	15 53.27
Sun . .	. . . . .	15 54.38
Sun . .	. . . . .	15 55.99
Moon .	+ 1 2.21	
Venus .	− 0 0.87	0 14.59

Apr. 30. Error of Runs +0″17. Mic. coincidence, 40*r*021.
May 1. do. do. 0.07. do. 40.045.
" 2. do. do. +0.39. do. 40.126.
" 3. do. do. −0.40. do. 40.130.
" 3, 23*h*. do. −0.67. do. 40.130.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	TH At.
			s.	s.	s.	s.	s.	s.	s.	H. M. s.	° ′ ″	″	″	″	″	*Revs.*	*In.*	°
May 12	1								53.5		52 35 26.1	20.5	37.1	40.5	31.05	. .	29.924	62.3
	2						48.0				53.0	47.1	62.0	67.8	57.48	39.925		
	3	Polaris, S. P. (Mic.)				38.0				13 3 39.61	" " "	"	"	"	"	39.997		
	4				33.5						" " "	"	"	"	"	39.905	29.922	63.0
	5		31.0								19.9	14.4	32.0	34.8	25.28	. .	29.916	63.5
	6	α Virginis	11.3	22.4	33.3	45.0	55.8	7.2	18.2	13 16 44.74	310 45 41.3	46.8	59.8	63.7	52.90	. .		
	7	η Ursæ Majoris . . .	14.8	32.3	49.4	7.0	23.2	40.3	58.0	13 41 6.43	11 10 61.5	57.5	72.4	75.8	66.80	. .	29.928	62.0
	8	α Bootis, (Mic. 4.) . .	42.4	54.6	6.0	17.2	29.3	40.8	52.3	14 8 17.51	341 5 50.9	57.0	67.3	71.2	61.60	39.368	29.928	61.0
	9	α² Libræ	27.8	39.4	51.0	1.6	13.2	..	36.2	14 41 58.20	305 43 25.8	31.1	44.6	48.7	37.57*d*	. .	29.940	60.6
	10	β Ursæ Minoris . . .	45.5	28.0	9.2	51.0	31.8	14.2	55.5	14 50 50.74	35 52 37.4	51.7	45.6	52.3	46.78	. .	29.942	61.5
	†11		..	..	45.0	56.5	9.0	20.5	32.8	17 12 8.76	300 48 18.8	25.9	37.3	41.5	30.87	41.700	29.932	56.8
	12	Moon, 2d and N. L. (Mic. 6.)	..	..	..	..	..	..	..		" " "	"	"	"	"	41.710		
	13		..	..	..	..	..	..	..		" " "	"	"	"	"	41.715		
	14		..	..	..	..	..	..	..		" " "	"	"	"	"	35.880		
	15	Moon, S. L. (Mic.2.)	..	..	..	..	..	..	..		" " "	"	"	"	"	35.825		
	†16		..	..	..	..	..	..	..		" " "	"	"	"	"	35.755		
13	17	δ Leonis	57.5	9.4	21.0	32.5	44.5	56.5	8.0	11 5 32.77	342 28 21.3	18.9	38.1	41.2	29.87	. .	30.010	70.5
	18	δ Hydræ et Crat. . .	43.5	55.0	6.3	17.3	28.3	40.0	51.2	11 11 17.37	307 10 24.0	29.0	42.5	46.0	35.37	. .	30.010	70.5
	19	γ Cephei, S. P. . . .	20.8	10.0	58.0	45.0	33.5	21.0	9.5	11 32 44.21	64 17 63.8	58.5	76.4	77.0	68.92	. .	30.016	70.6
	20	β Leonis	16.4	27.7	39.0	50.5	1.7	13.2	24.3	11 40 50.40	. . . .	..	..	..	. .	. .		
	21	γ Ursæ Majoris . . .	23.2	42.5	1.1	20.1	38.9	58.0	17.0	11 45 20.11	15 39 4.2	1.5	15.0	18.3	9.75	. .	30.028	71.0
	22	δ Corvi	39.2	10.6	22.0	33.0	44.4	56.2	7.5	12 21 33.27	305 27 41.9	47.0	59.5	64.0	53.01	. .	30.031	71.0
	23								56.3		52 35 29.3	23.2	38.8	39.1	32.60	. .	30.036	70.0
	24	Polaris, S. P. . .						46.5			40.0	34.1	51.0	52.0	44.27	. .		70.0
	25						45.5			12 53 16.32	48.6	42.1	57.4	58.5	51.67*d*	. .		69.5
	26					37.0					49.5	44.0	59.2	59.0	52.92*d*	. .		
	27	ε Bootis	17.0	29.8	42.0	54.2	6.8	19.0	34.5	14 37 54.33	. . . .	..	..	..	..	. .		
	†28	α² Libræ	27.5	39.0	50.5	1.5	13.0	24.5	35.8	14 42 1.69	305 43 23.2	27.9	41.3	40.0	33.10	. .	30.050	69.0
	29	δ Ophiuchi	23.1	34.1	45.0	56.0	7.0	18.0	29.0	16 5 56.03	317 49 26.0	31.1	43.0	45.0	36.27	. .	30.050	68.1
	30	α Scorpii	1.7	14.0	26.0	38.3	50.3	2.8	15.0	16 19 38.30	295 3 7.6	12.0	25.3	23.5	17.10	. .	30.050	68.0
	31	α Ophiuchi	52.5	3.9	15.0	26.0	37.5	48.5	..	17 27 26.20	333 47 16.2	21.0	30.8	31.8	24.95	. .	30.058	67.0
	32	γ Draconis	46.9	5.0	22.4	40.0	57.3	15.3	32.5	17 52 39.91	12 36 31.2	29.8	43.3	45.0	36.82	. .	30.060	66.8
	33	μ¹ Sagittarii	37.5	49.4	0.4	12.5	23.5	36.0	48.0	18 3 12.47	300 2 20.7	25.0	35.2	37.3	29.55	. .	30.066	66.6
	†34	Moon, 2d and N. L. .	4.0	16.2	28.0	40.1	52.0	4.1	16.0	18 14 40.06	301 30 34.0	40.5	52.0	55.0	45.37	. .	30.066	66.6
	†35	α Lyræ	39.5	54.0	7.5	21.8	35.5	49.7	3.8	18 31 21.69	. . . .	..	..	..	..	. .		
	36	σ Sagittarii	45.3	57.8	10.0	22.2	34.4	46.7	59.0	18 45 22.20	294 39 30.4	34.6	46.0	52.0	40.75	. .	30.066	66.1
	37	ο Sagittarii	31.0	42.9	54.5	6.5	18.2	30.0	41.8	18 55 6.41	299 10 24.4	30.0	42.6	44.6	35.40	. .	30.066	66.0
18	38				59.0						49 34 18.2	21.7	33.1	39.0	28.00	. .		
	39	Polaris				55.0				1 6 19.75	17.3	21.0	31.8	37.8	26.97	. .	30.146	59.0
	40						43.0				19.4	23.5	34.5	40.3	29.42	. .		
	41							42.0			27.0	30.5	40.9	47.8	36.55	. .		
	42	Mercury, 2d and N. L.	21.0	32.0	43.2	54.0	5.3	16.4	27.2	2 6 54.16	330 28 32.0	47.2	51.4	57.2	46.98*d*	. .	30.156	59.8
	†43	Mercury, S. L. (Mic. 4)	..	..	..	..	..	..	..		" " "	"	"	"	"	39.880		
	†44	β Ursæ Minoris, S. P. .	54.0	11.0	29.3	49.0	6.0	25.0	43.4	2 50 48.24	66 17 7.2	8.6	20.2	24.3	15.08	. .	30.150	61.1
19	†45	Sun, 1st & N.L. (Mic.6)	53.6	5.6	17.0	28.0	40.2	52.0	3.0	3 42 28.49	340 55 22.5	37.8	41.8	47.2	37.38	39.882	30.134	60.6
	†46	Sun, 2d & S.L. (Mic. 2)	9.0	20.2	32.0	43.8	55.2	7.0	19.0	3 44 43.74	" " "	"	"	"	"	40.050		
	47	δ Orionis	5.7	16.8	27.8	39.0	..	0.8	11.0	5 23 36.85	320 40 22.3	37.3	44.0	49.2	38.24	35.493	30.112	
	48	κ Orionis	24.0	35.2	46.0	57.2	8.2	19.4	31.0	5 39 57.29	311 23 17.6	33.8	38.5	42.0	32.98	42.322	30.102	62.8
	49	β Corvi	15.3	27.5	39.0	51.0	2.2	14.5	26.5	12 25 50.86	298 34 53.4	68.8	76.0	79.6	69.45	. .	30.060	61.3
	50	α Scorpii	55.0	7.2	19.4	32.0	55.0	56.2	8.8	16 19 31.80	295 3 7.2	20.5	30.2	34.5	23.10	. .	30.044	57.8
	51	ε Ursæ Minoris . . .	22.0	45.0	5.8	27.5	48.2	10.5	31.5	17 1 27.21	43 22 10.0	15.0	25.3	32.2	20.64	. .	30.040	57.5
	52	Polaris	5.0								49 34 41.0	45.6	53.0	61.6	50.30	. .	30.030	61.5

DATE.	VALUE OF m.	n.	c.	CLOCK. At 12*h*.	H. Rate. 0*s*.
	s.	s.	s.	s.	
May 12	+0.590	+0.458	+0.207	*s* 22.584	*l* .037
13	0.505	0.353	0.207	22.975	.026
19	+0.505	+0.353	+0.207	*s* 29.708	*l* .026

11 to 16. Observed for declination of N. L. at 10 M. 8 S., 10 M. 21 S., and 10 M. 33 S.
" " " S. L. at 10 M. 57 S., 11 M. 12 S., and 11 M. 25 S.
" Correction for defective illumination of N. L., +0″.13.
28. Lamp flaring with the wind.
34. Steady and well defined.
35. A very bad observation.
43. Very unsteady.
44. Faint and unsteady.
45. 46. Observed for declination of N. L. at wire III—S. L. at wire V.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.11	+ 1 36.38	52 37 7.54	. .						
− 0 7.06	1 17.08	7.50	. .						
0 64.58	1 14.80	7.70	60 20	+ 22.62	− 0 25.78	13 3 36.45	+ 88 29 14.52	+ 81.91	+81.15
− 0 7.75	1 17.39	7.12	. .						
+ 0 0.13	+ 1 36.90	2.31	. .						
− 0 0.19	− 1 5.39	310 44 47.32	. .	.63	+ 0 0.71	13 17 8.08	− 10 21 33.63	9.69	−61.03
0 0.20	+ 0 11.15	11 11 17 75	. .	.64	0 1.45	13 41 30.52	+ 50 4 56 80	6.96	70.12
0 19.35	− 0 19.70	341 05 22.43	. .	.66	0 0.98	14 8 41.15	+ 19 59 1.48	8.29	67.66
− 0 0.02	− 1 19.97	305 42 17.58	. .	.67	0 4.47	14 42 25.35	− 15 24 3.37	+ 9.99	51.58
+ 0 0.04	+ 0 41.73	35 53 5.01	. .	.69	+ 0 3.37	14 51 16.80	+ 74 47 6.82	− 4.52	58.67
15 22.54	48 49.22	. . . .	. .						
15 22.88	48 48.64	. . . .	. .						
+15 23.06	48 48.35	301 36 33.57	. .	.78	− 0 10 96	17 11 18.63	− 19 29 47.38	. .	. .
−17 4.18	48 59.23	. . . .	. .						
17 6.09	48 59.84	. . . .	. .						
17 8.50	+49 0.19	. . . .	. .						
0 0.59	− 0 17.70	342 28 11.58	58.95	.95	+ 0 0.86	11 5 56.58	+ 21 21 51.88	+ 10.76	68.23
0 0.62	− 1 13.74	307 9 22.19	. .	.95	+ 0 0.63	11 11 40.95	− 13 56 58 69	9.69	−56 19
0 0.06	+ 1 56.03	64 20 4.89	. .	.96	− 0 1.84	11 33 5.33	+ 76 46 14.81	8.72	+86.57
. . .	. . .	. . . .	. .	.97	+ 0 0.81	11 41 14.18	. . . .	10.03	. .
0 0.06	+ 0 15.75	15 39 25.44	. .	.97	0 1.35	11 45 44.43	+ 54 33 5.74	10.58	−79.56
− 0 0.35	− 1 18.84	305 26 33.82	. .	.98	0 0.62	12 21 56.87	− 15 39 45.88	9.70	−60.86
+ 0 0.18	+ 1 35.31	52 37 8.99	. .						
+ 0 0.10	1 23.25	7.62	. .	23.00	10 1.56	13 3 40.88	+ 88 29 14.35	81.65	+81.36
. . .	1 15.91	7.57	. .						
. . .	+ 1 13.04	5.56	. .						
. . .	. . .	. . . .	. .	.04	0 0.92	14 38 18.29	. . . .	7.83	. .
− 0 0.57	− 1 18.29	305 42 14.24	. .	.04	0 0.62	14 42 25.35	− 15 24 5.48	9.98	−51.57
0 0.62	0 51.31	317 48 44.34	. .	.08	0 0.69	16 6 19.80	− 3 17 35.30	9.50	35.29
− 0 0.11	2 0.60	295 1 16.09	. .	.09	0 0.56	16 20 1.95	− 26 5 3.31	11.09	33.22
+ 0 0.23	− 0 27.98	333 46 57.20	. .	.12	0 0.80	17 27 50.12	+ 12 40 37.50	8.40	−11.19
− 0 0.22	+ 0 12.74	12 36 49.34	. .	.13	0 1.28	17 53 4.32	+ 51 30 29.24	3.04	+ 1.63
+ 0 0.19	− 1 38.19	300 0 51.55	. .	.13	+ 0 0.59	18 3 36.19	− 21 5 28.15	11.24	− 5.76
− 0 0.29	+32 41.63	302 3 26.71	. .	.13	− 0 0.60	18 13 54.57	− 19 2 52.99	. .	. .
. . .	. . .	. . . .	. .	.14	+ 0 1.05	18 31 45.88	. . . .	5.71	. .
0 0.26	− 2 3.62	294 32 36.87	. .	.15	0 0.56	18 45 45.91	− 26 28 42.83	11.88	+ 4.27
0 0.62	− 1 41.85	299 8 52.93	. .	.15	+ 0 0.59	18 55 30.15	− 21 57 26.77	11.51	8.19
0 0.24	+ 1 5.09	49 35 33.33	. .						
− 0 0.24	1 7.79	35.00	63.88	+ 29.42	− 3 5.33	1 3 43.84	+ 88 29 9.94	+ 77.13	+82.38
+ 0 0.25	1 5.61	35.28	. .						
− 0 0.23	+ 0 58.37	34.69	. .						
0 0.02	− 0 27.64	330 28 14.89	. .	.45	+ 0 0.66	2 7 24.02	+ 9 21 50.35	. .	. .
0 8.70	− 0 27.64		. .						
− 0 8.75	+ 2 9.93	66 19 16.26	. .	.47	− 0 1.53	2 51 16.18	+ 74 47 8.37	− 4.38	−58.60
+14 25.45	− 0 16 82	340 53 50.11	. .						
−17 25.82	0 17.34		. .	.49	+ 0 0.85	3 44 6.45	+ 19 47 25.48	. .	. .
+ 1 15.44	0 46.74	320 39 51.45	. .	.54	0 2.53	5 24 8.92	− 0 25 15.39	+ 11.79	+22.51
− 0 0.04	1 4.66	311 22 28.28	. .	.54	0 0.66	5 40 27.49	− 9 43 56.35	10.99	+19.23
− 0 0.07	1 45.98	298 33 23.40	62.58	.72	0 0.59	12 26 21.17	− 22 32 59.93	9.70	−59.48
+ 0 0.03	− 2 4.29	295 1 18.84	. .	.82	0 0.56	16 20 2.18	− 26 5 4.49	+ 11.00	32.97
− 0 0.11	+ 0 55.07	43 23 15.60	. .	.84	+ 0 4.71	17 2 1.76	+ 82 16 52.27	− 31.07	−19.18
− 0 0.05	+ 0 43.00	49 35 33.33	. .						

NADIR POINTS.				
A.	B.	C.	D.	Means
	May	13,	Night.	° ′ 179 59
52″8	57″3	62″0	61″0	58″27
52.3	57.8	63.0	60.0	58.28
53.0	58.4	64.0	62.0	59.35
53.3	59.2	65.0	62.3	59.95
52.5	57.7	63.0	62.3	58.38
52.78	58.08	63.40	61.52	58.95
	May	18,	2h.	179 59
50.8	65.1	68.6	72.3	63.95
50.4	65.0	66.7	72.2	63.58
51.0	65.8	67.2	73.1	64.27
50.5	65.3	67.0	72.5	63.80
50.4	65.3	66.6	72.8	63.77
50.62	65.30	67.02	72.58	63.88
	May	19,	19.2h.	179 59
49.2	63.7	66.5	71.3	62.08
48.9	64.0	66.5	70.2	62.40
49.3	63.8	66.3	70.8	62.55
48.9	63.7	66.6	70.8	62.50
49.6	64.0	66.7	70.7	62.75
49.18	63.84	66.52	70.76	62.58

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Moon .	— 1 1.95	16 8.86
Moon .	1 9.22	
Mercury	— 0 0.25	0 4.32
Sun .	. . . .	15 56.89

May 12. Error of Runs, +0″66. Mic. coincidence, 40r.130.
" 13. do. do. +1.18.
" 18. do. do. —0.25. do. do. 40.127.
" 19. do. do. —0.25. do. do. 40.137.
" 13. The wind throughout the night being very high, it was found impossible to get a good nadir point.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

APPARENT Æ. AND DEC. OBSERVED WITH THE MERIDIAN CIRCLE.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.		TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.	Observers.
				s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
May 19	†1		Polaris		10.5						1 2 54.07	49 34 31.0	35.6	43.2	52.0	40.45	. .				M.
	2					0.0						23.0	28.1	36.4	43.3	32.70	. .	30.010	61.6	66.2	
	3						55.0					21.3	26.3	33.5	41.5	30.65	. .				
	4							45.0				23.0	28.0	36.5	43.2	32.67	. .	30.024	62.0	66.4	
	5								44.0			28.0	34.5	42.2	49.0	38.47	. .				
	†6									39.0		41.0	46.8	54.5	62.2	51.12	. .	30.029	62.5	66.4	
20	7	δ	Hydræ et Crat. . .	36.5	47.9	59.0	10.5	21.7	33.0	44.5	11 11 10.44	307 10 16.5	29.8	39.0	43.1	32.10	. .	29.860	68.0	65.5	
	8		Leonis, 3964 . . .	41.9	54.0	5.7	17.8	29.2	41.1	53.0	11 32 17.51	343 18 49.6	64.9	69.2	75.0	64.67	. .	29.860	67.8	64.5	
	9	β	Leonis	9.2	20.5	31.9	43.5	54.9	6.3	17.6	11 40 43.41	. . . .	..	..	..	. .	. .				
	10	γ	Ursæ Majoris . . .	16.1	35.0	54.0	13.0	31.7	50.7	9.5	11 45 12.85	15 39 2.0	7.5	15.5	20.2	11.30	. .		67.5	63.5	
	†11	ζ	Aquilæ	18.0	29.4	40.5	51.6	3.0	14.5	25.5	18 57 51.79	334 45 4.8	19.6	22.8	30.0	19.30	. .	29.924	58.5	52.0	
	†12	δ	Aquilæ	42.9	54.0	4.9	16.0	26.5	37.5	48.6	19 17 15.77	323 55 45.7	61.2	68.3	72.7	61.97	. .	29.924	58.2	52.0	
	13	γ	Aquilæ	54.5	6.0	16.9	28.0	39.0	50.4	1.3	19 38 28.01	331 21 18.5	32.7	37.5	45.0	33.42	. .		58.2	51.6	
	14	α	Aquilæ	14.3	25.5	36.8	47.9	59.0	10.0	21.2	19 42 47.81	. . . .	..	..	..	. .	. .				
	15	β	Aquilæ	43.6	54.7	5.8	16.7	27.7	38.8	49.9	19 47 16.74	327 8 27.8	44.3	48.2	56.0	44.07	. .	29.934	57.8	51.1	
	16		Venus, 2d and N. L.	42.7	53.9	4.7	16.0	26.4	38.0	49.0	0 55 15.81	325 8 0.0	18.1	23.1	25.3	16.62	. .	30.042	62.6	69.5	H.
	17		Venus, S. L. (Mic. 4)	..	..	..	..	..	..	..		" " "	"	"	"	"	39.440				
	18		Polaris	7.0							1 4 5.83	49 34 39.5	44.3	53.4	60.7	49.47	. .	30.942	62.0	68.9	
	19				10.0							26.5	31.0	41.1	48.0	36.65	. .				
	20						59.0					19.3	23.8	33.0	39.6	28.92	. .	39.042	62.8	69.8	
	21							49.0				21.0	26.2	35.7	41.8	30.17	. .				
	22								48.0			28.4	33.4	42.2	49.9	38.47	. .	30.052	65.3	70.6	
	23									42.0		40.0	44.7	54.0	61.6	50.07	. .				
	†24		Mercury 2d & N. L.	57.2	9.0	20.1	31.2	42.0	53.0	4.2	2 15 30.96	331 18 53.3	55.4	58.5	57.0	56.05	.. .	30.060	64.4	74.5	
	†25	β	Ursæ Min. S.P. (Mic4.)	..	10.6	29.5	..	6.3	24.2	43.0	2 50 22.72	66 16 28.7	19.7	29.5	26.5	26.11	41.255	30.062	65.3	73.0	
21	†26		Sun, 1st & N.L (Mic.5)	52.3	4.4	16.0	27.2	39.2	51.0	3.0	3 50 27.59	341 30 2.3	4.4	7.2	4.4	4.57	38.556	30.064	67.0	74.1	
	†27		Sun, 2d & S. L. (Mic.3)	7.2	19.2	30.9	42.2	54.1	6.0	18.0	3 52 42.51	341 10 4.4	5.5	10.4	6.8	6.77	38.556				
	28	α	Aurigæ	..	..	33.2	48.4	4.2	20.2	36.1	5 5 4.42	6 56 15.4	10.8	17.6	17.0	15.20	. .	30.058	67.8	76.0	
	29	δ	Orionis, (Mic. 4) . .	5.3	16.2	27.2	38.0	49.2	0.0	11.0	5 23 38.14	320 40 29.7	32.2	37.0	45.1	36.02*d*	42.400				
	30	12	Canum Venat. . . .	37.5	52.1	6.0	20.2	34.0	48.4	2.5	12 48 20.10	0 15 22.0	21.2	23.3	24.5	22.75	. .				
	31		Polaris, S. P. . .					34.0			13 3 39.50	52 35 51.4	40.6	50.2	50.5	48.17	. .	30.114	66.8	61.7	
	32						37.5					55.5	45.3	54.4	54.4	52.40	. .				
	33					47.0						53.1	42.7	52.6	52.5	50.22	. .	30.110	66.2	61.0	
	34	α	Virginis	4.0	15.2	26.4	37.2	48.6	59.8	11.0	13 16 37.46	310 45 49.4	49.5	56.3	55.7	52.72	. .			60.5	
	35	δ	Ursæ Minoris . . .	..	18.0	42.0	11.0	..	..	..	18 23 40.33	. . . .	..	..	..	. .	. .				
	36	α	Lyræ	32.6	46.6	1.0	15.0	29.0	42.5	56.8	18 31 14.79	359 44 60.0	57.6	61.7	61.0	60.07	. .				
25	37	α	Lyræ	29.0	43.3	57.2	11.5	25.1	39.5	53.2	18 31 11.26	. . . .	..	..	..	. .	. .				M.
	38	β	Lyræ	12.3	25.5	38.5	51.5	4.5	17.7	31.0	18 43 51.58	. . . .	..	..	..	. .	. .				
27	39	α	Serpentis	35.0	45.3	57.1	8.4	19.3	30.3	41.0	15 35 8.10	328 1 42.9	45.6	46.9	50.9	46.58	. .	29.720	76.0	73.5	
	40	ζ	Ursæ Minoris . . .	23.6	18.5	12.2	6.0	0.0	53.6	48.0	15 49 5.99	39 21 42.2	32.8	40.0	41.8	39.20	. .	29.720	76.0	73.5	
	41	δ	Ophiuchi	11.0	22.0	33.0	44.0	55.0	6.0	17.0	16 5 44.00	317 49 33.4	32.7	40.1	41.3	36.87	. .	29.720	76.0	73.5	
June 2	42	ε	Bootis, (Mic. 4) . .	58.0	10.4	22.8	35.1	47.3	0.2	12.0	14 37 35.11	348 49 27.5	28.5	32.3	32.5	29.74	41.124	29.928	73.0	67.0	H.
	43	α²	Libræ	8.3	20.0	31.2	42.3	53.4	5.2	16.2	14 41 42.37	305 43 29.8	30.9	38.2	35.2	34.56*d*	. .				
	44	β	Ursæ Minoris . . .	25.0	7.3	48.5	30.5	12.0	54.2	36.0	14 50 30.50	35 52 52.7	42.1	50.2	49.2	48.55	. .	29.932	72.5	66.8	
	45	β	Libræ	30.8	42.0	52.8	3.5	15.0	26.2	37.1	15 8 3.91	312 18 31.8	34.0	41.8	39.1	36.67	. .	29.940	72.0	66.8	
	46	α	Cor. Bor	52.5	5.2	17.4	30.0	42.1	54.4	6.4	15 27 29.71	348 20 40.4	42.5	46.0	44.2	43.28	. .	29.946	71.5	66.7	
	47	α	Serpentis	28.2	39.1	50.2	1.0	12.1	23.2	34.1	15 36 1.13	328 1 42.2	44.1	50.3	47.0	45.92*d*	. .	29.952	71.4	66.8	
	†48	ζ	Ursæ Minoris (Mic. 4.)	15.5	11.5	4.0	59.0	..	46.0	40.0	15 48 49.33	39 20 62.2	53.3	62.2	61.1	59.70	41.130	29.954	71.2	67.0	
	49	β¹	Scorpii	15.0	27.0	38.3	50.0	1.5	13.1	25.0	15 55 50.00	301 45 1.2	2.0	9.6	7.6	5.10	. .	29.958	71.0	67.0	
	50	δ	Ophiuchi	4.3	15.2	26.0	37.2	48.0	59.0	10.2	16 5 37.13	317 49 31.6	32.9	38.9	37.5	35.22*d*	. .	29.960	70.8	66.1	
	51	η	Draconis	4.0	27.3	50.8	14.0	36.8	0.3	23.3	16 21 13.79	22 57 50.2	43.3	50.8	49.0	48.32	. .	29.960	70.8	66.1	
	52	ε	Ursæ Minoris . .	9.0	31.5	52.0	15.0	34.5	58.0	19.0	17 1 14.14	43 22 24.6	17.0	25.6	25.0	23.16*d*	. .	29.968	70.6	65.9	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 16*h*.	H. Rate. 0*s*.
	s.	s.	s.	s.	
May 20	+0.505	+0.353	+0.207	*s* 29.991	*l* .018
21	.505	.353	.207	30.231	.021
25	.505	.353	.207	33.686	.044
27	.505	.353	.207	35.269	.038
June 2	+0.198	+0.396	+0.247	*s* 42.550	*l* .009

1 to 6. Very faint and unsteady.
11, 12. Blurred and very unsteady.
24. Unsteady by fits.
25. Observed for declination at wire IV.
26 & 27. Observed for declinations of N. L. at wire III—S. L. at wire V.
48. Observed for declination at wire IV.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO **1850.0.**	
For Inst.	For Obj'ts.		**359°59'**	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
' "	' "	° ' "	"	s.	m. s.	h. m. s.	° ' "	s.	"
− 0 0.05	+ 0 55.99	49 35 36.39	62.58						
0 0.00	1 3.52	36.22	. .						
0 0.00	1 6.24	36.89	. .	+ 29.72	+ 0 21.71	1 3 45.50	+ 88 29 10.98	+ 76.55	+82.60
0 0.00	1 4.04	36.22	. .						
0 0.00	0 55.98	34.45	. .						
0 0.05	+ 0 44.67	35.79	. .						
− 0 0.57	− 1 14.03	307 9 17.50	63.58	.91	0 0.63	11 11 40.98	− 13 57 6.83	9.77	−56.37
0 0.40	− 0 16.89	343 18 47.38	. .	.91	0 0.87	11 32 48.29	+ 22 12 23.05	10.45	70.68
. . .	. . .	. . . .	. .	.92	0 0.81	11 41 14.14	. . . .	10.11	. .
0 0.06	+ 0 15.85	15 39 27.09	. .	.92	0 1.36	11 45 44.13	+ 54 33 2.76	10.75	−80.67
0 0.11	− 0 27.31	334 44 52.10	. .	30.05	0 0.80	18 58 22.64	+ 13 38 18.49	8.41	+16.77
+ 0 0.38	0 42.13	323 55 20.22	. .	.05	0 0.73	19 17 46.55	+ 2 48 55.89	9.48	20.84
− 0 0.19	0 31.62	331 21 1.61	. .	.06	0 0.78	19 38 58.85	+ 10 14 37.28	8.94	28.65
. . .	. . .	. . . .	. .	.06	0 0.77	19 43 18.64	. . . .	9.23	
+ 0 0.10	0 37.44	327 8 6.73	. .	.06	0 0.75	19 47 47.55	+ 6 1 42.40	9.33	28.39
− 0 0.26 − 0 23.21	0 32.76 0 32.79	325 7 32.11	62.67	29.90	+ 0 0.74	0 55 45.73	+ 4 1 8.78	. .	. .
+ 0 0.44	+ 0 42.82	49 35 33.73	. .						
0 0.00	0 55.62	32.27	. .						
0 0.00	1 5.82	34.74	. .	.90	− 0 47.45	1 3 48.28	+ 88 29 9.54	+ 75.92	+82.83
0 0.00	1 3.41	33.58	. .						
0 0.00	0 56.06	34.53	. .						
+ 0 0.44	+ 0 44.15	34.66	. .						
− 0 0.35	− 0 31.69	331 18 24.01	59.93	.93	+ 0 0.78	2 16 1.43	+ 10 12 3.33	. .	. .
+ 0 42.06	+ 2 6.31	66 19 11.42	. .	.94	0 23.21	2 51 15.87	+ 74 47 9.26	− 4.36	−61.30
+ 4 53.28 − 6 43.14	− 0 15.90 − 0 16.41	341 18 48.29	. .	.96	+ 0 0.86	3 52 5.87	+ 20 12 31.41	. .	. .
− 0 0.11	+ 0 7.49	6 56 22.58	. .	.98	− 0 14.54	5 5 19.86	+ 45 50 1.90	+ 16.89	+21.55
+ 1 18.39	− 0 45.38	320 41 2.45	. .	.99	+ 0 0.71	5 24 8.84	− 0 25 11.65	11.79	+22.30
0 0.05	+ 0 0.24	0 15 23.04	62.12	30.07	+ 0 1.06	12 48 51.23	+ 39 9 0.17	8.99	−75.32
0 0.05	0 16.67	52 37 4.89	. .						
0 0.06	1 14.47	7.33	. .	.15	− 0 21.43	13 3 48.22	+ 88 29 16.24	75.38	+82.92
+ 0 0.06	+ 1 17.42	7.68	. .						
− 0 0.13	− 1 6.23	310 44 46.36	. .	.08	+ 0 0.65	13 17 8.19	− 10 21 36.51	9.73	−61.19
. . .	. . .	. . . .	. .						
0 0.00	0 0.24	359 44 59.83	. .	.17	0 1.06	18 31 46.02	+ 38 38 38.38	5.51	+13.16
. . .	. . .	. . . .	. .	33.80	0 1.06	18 31 46.12	. . . .	5.42	. .
. . .	. . .	. . . .	. .	.80	0 0.98	18 43 26.37	. . . .	6.18	. .
0 0.45	− 0 34.37	328 1 11.76	60.70	35.25	0 0.76	15 35 44.11	+ 6 54 50.31	+ 8.79	−43.57
0 0.24	+ 0 45.15	39 22 24.03	. .	.26	0 3.28	15 49 44.53	+ 78 16 2.65	− 13.09	46.54
− 0 0.58	− 0 49.85	317 48 46.44	. .	.27	0 0.69	16 6 19.96	− 3 17 35.01	+ 9.35	36.54
+ 0 34.01	+ 0 11.09	348 49 51.96	60.95	42.54	0 0.68	14 38 18.33	+ 27 43 30.13	7.85	60.61
− 0 0.02	− 1 17.95	305 42 16.63	. .	.54	0 0.35	14 42 25.26	− 15 24 5.07	+ 9.93	51.65
+ 0 0.30	+ 0 40.65	35 53 29.25	. .	.54	0 2.59	14 51 15.63	+ 74 47 7.80	− 3.93	64.87
− 0 0.15	− 1 1.70	312 17 34.82	. .	.54	0 0.39	15 8 46.84	− 8 48 46.88	+ 9.64	48.27
+ 0 0.07	0 11.61	348 20 31.74	. .	.55	0 0.68	15 28 12.94	+ 27 14 10.04	7.37	49.54
− 0 0.06	− 0 35.11	328 1 10.75	. .	.55	0 0.49	15 36 44.17	+ 6 54 49.05	+ 8.77	44.41
+ 0 34.34	+ 0 46.11	39 22 20.15	. .	.55	0 12.24	15 48 44.12	+ 78 15 58.45	− 12.92	48.40
− 0 0.02	− 1 30.60	301 43 34.48	. .	.55	0 0.32	15 56 32.87	− 19 22 47.22	+ 10.32	37.82
− 0 0.02	− 0 49.81	317 48 45.39	. .	.55	0 0.42	16 6 20.10	− 3 17 37.26	9.31	37.10
− 0 0.20	+ 0 23.88	22 58 12.00	60.95	.55	0 1.49	16 21 57.81	+ 61 51 50.30	+ 0.36	36.58
+ 0 0.03	+ 0 53.23	43 23 16.42	. .	.56	+ 0 4.96	17 2 1.66	+ 82 16 54.72	− 31.34	−23.90

NADIR POINTS.				
A.	B.	C.	D.	Means
	May	18, 2*h*.		° '
				179 59
50″8	65″1	67″6	72″2	65″92
50.4	65.0	66.7	72.2	63.58
51.0	65.8	67.2	73.1	64.28
50.5	65.3	67.0	72.5	63.82
50.4	65.3	66.6	72.8	63.18
50.62	65.30	67.02	72.56	63.88
	May	19,	12*h*.	**179 59**
49.2	63.7	66.5	71.3	62.68
48.9	64.0	66.5	70.2	62.40
49.3	63.8	66.8	70.8	62.55
48.9	63.7	66.6	70.8	62.50
49.6	64.0	66.7	70.7	62.75
49.18	63.84	66.52	70.76	62.58
	May	20,	Night.	**179 59**
52.0	65.2	66.3	73.0	64.12
52.0	64.8	65.8	72.2	63.70
51.7	64.5	65.7	72.0	63.48
51.2	65.1	65.6	71.5	63.35
51.4	65.0	65.1	71.6	63.28
51.66	64.92	65.70	72.06	63.58
	May	20,	1.7*h*.	**179 59**
49.7	65.6	65.5	70.0	62.70
49.3	65.3	66.0	70.0	62.66
49.8	65.2	66.0	70.0	62.75
49.6	65.2	66.2	70.2	62.80
49.4	65.0	66.3	70.5	62.80
49.58	62.26	66.00	70.14	62.74
	May	20, 2*h*.		**179 59**
59.3	60.3	60.4	59.8	59.96
59.1	60.0	60.5	60.0	59.90
59.5	60.3	60.4	59.9	60.02
59.2	60.3	60.3	60.2	60.00
59.2	60.0	60.2	59.8	59.80
59.26	60.18	60.36	59.94	59.93
	May	21,	18*h*.	**179 59**
61.3	61.5	63.6	62.5	62.22
61.2	61.8	63.5	62.2	62.18
61.2	61.3	62.8	62.2	61.88
61.5	61.8	62.5	62.5	62.07
61.5	61.8	63.5	62.2	62.25
61.34	61.64	63.18	62.23	62.12
	May	26,	Night.	**179 59**
61.1	61.2	61.0	61.0	61.08
61.2	60.7	60.8	61.0	60.92
61.3	60.7	60.9	60.3	60.80
60.7	60.2	59.5	60.5	60.22
61.0	60.2	60.6	61.0	60.70
61.0	60.3	60.4	60.2	60.47
61.05	60.55	60.53	60.67	60.70
	June 2	16.5*h*.		**179 59**
60.4	61.0	63.0	60.3	61.18
60.0	60.6	62.9	60.0	60.87
60.0	60.6	62.5	60.0	60.78
60.1	61.2	62.6	60.0	60.97
60.12	60.85	62.75	60.08	60.95

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	' "
Venus .	— 0 0.72	0 11.49
Mercury	— 0 0.24	
Sun .	. . . .	15 49.86

May 20. Error of Runs +1″13. Mic. coin., 40*r*122.
" 21. do. do. —0.46. { 30.033; for 1st obs. of Sun. / 50.419; for 2d obs. of Sun. }
" 27. do. do. +1.07.
June 2. do. do. +0.76. " 40.132.
May 10, At 2*h*. Adjusted the micrometer heads, making them all read alike.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.	Observers.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
June 3	1	α Lyræ	20.3	34.7	48.6	2.9	16.8	30.9	44.9	18 31 2.73	359 45 3.7	0.5	3.0	3.1	2.56	. .				M
	2	δ Aquilæ	30.5	41.7	52.5	3.5	14.5	25.5	36.5	19 17 3.53	323 55 55.5	58.0	57.6	59.8	57.72	. .	30.010	70.7	66.0	
	3	α Aquilæ	2.4	13.6	24.5	35.7	46.5	57.7	8.8	19 42 35.60	. . . .	..	..	..	. .	. .				
	4	β Aquilæ	31.2	42.5	53.4	4.5	15.4	26.5	37.5	19 47 4.44	327 8 38.0	40.8	44.0	43.5	41.57	. .	30.000	70.0	65.0	
	5	Venus, 2d and N. L.	..	27.3	38.6	50.0	0·8	12.3	23.2	1 50 58.37	330 6 1.4	2.6	6.3	3.2	3.37	. .	29.984	74.0	81.1	H
4	†6	Sun, 1st & N. L. (Mic. 5.)	31.0	43.0	54.8	6.5	18.2	30.2	42.2	4 47 6.56	343 41 59.7	61.6	63.5	61.5	61.57*d*	43.164				
	†7	Sun, 2d & S. L. (Mic. 3.)	47.8	59.2	11.5	23.5	35.2	47.1	59.0	4 49 23.33	343 22 8.4	10.1	17.0	12.7	12.05	43.164	29.940	78.5	88.4	
	8	12 Can. Venat.	24.2	39.3	53.0	7.1	21.0	35.6	49.2	12 48 7.06	0 15 53.2	53.2	55.4	56.6	54.60	. .				
	9	Polaris, S. P.							53.0		52 35 66.8	57.8	69.2	66.7	65.12	. .	29.826	75.8	72.4	
	10						44.5				36 25.7	16.5	27.0	24.8	23.50	. .				
	11					33.0				13 3 37.30	27.0	17.6	28.2	26.1	24.72	. .	29.822	75.4	71.8	
	12				30.5						24.3	14.4	25.5	23.3	21.87	. .				
	13		25.5								35 65.0	55.0	65.2	62.9	62.02	. .	29.824	75.0	71.6	
	14	α Virginis	51.0	2.2	13.2	24.2	35.0	46.1	58.0	13 16 24.24	. . . .	..	..	..	. .	. .				
	15	η Ursæ Majoris	55.0	12.0	29.2	46.1	2.8	20.2	37.4	13 40 46.10	11 11 42.8	35.8	43.3	44.0	41.47	. .			71.3	
	16	η Bootis	5.1	17.0	28.6	40.0	51.4	3.2	14.4	13 46 39.96	340 17 22.1	24.6	28.6	27.7	25.75	. .	29.820	74.8	71.1	
	17	α Bootis	22.2	34.0	44.1	57.3	..	..	..	14 7 39.65	341 6 14.0	15.3	20.6	18.6	17.12	. .	29.818	75.2	71.2	
	†18	Venus, 2d and N. L.	23.2	34.5	45.3	56.5	7.8	19.0	29.8	1 54 56.59	330 27 56.3	57.5	60.8	58.5	58.27	. .	29.790	76.2	80.5	
	†19	Venus, S. L. (Mic.)	..	..	..	..	..	..	..		" "	"	"	"	"	39.490				
	†20	β Ursæ Minoris, S. P.	39.2	57.0	16.2	34.5	53.2	10.8	29.0	2 50 34.27	66 16 45.0	34.8	44.6	42.6	41.79	40.848	29.794	77.0	82.4	
	21	α Persei	48.0	5.0	21.8	38.8	55.0	12.2	28.9	3 12 38.53	10 24 34.3	29.3	33.5	36.2	33.32	. .	29.788	77.0	84.4	
5	†22	Sun, 1st and S. L.	33.8	46.2	58.2	10.0	21.8	34.0	45.2	4 51 9.89	343 41 19.5	20.4	23.0	21.8	21.17	36.700	29.762	79.0	85.5	
	†23	Sun, 2d and N. L.	54.0	6.2	18.2	30.0	41.8	54.0	5.8	4 53 30.00	" "	"	"	"	"	40.952	29.762	79.3	87.5	
6	24	Sun, 1st and N. L.	44.0	56.5	8.0	20.0	31.5	43.8	55.5	4 55 19.90	344 2 44.8	44.8	47.2	48.5	46.33	. .	29.952	74.8	77.2	M
	25	Sun, 2d L.	1.4	13.4	25.3	37.0	49.0	1.0	12.9	4 57 37.14	. . . .	..	..	..	. .	. .				
	26	β Corvi	2.0	14.0	25.6	37.5	49.5	1.5	13.3	12 25 37.63	298 35 0.0	0.8	5.8	8.5	3.77	. .	30.000	75.0	69.5	
	27	Polaris, S. P.							50.5		52 35 38.5	26.5	38.1	37.5	35.15	. .	30.000	74.0	68.0	
	28							45.5			53.2	42.2	52.6	52.8	50.20	. .				
	29						44.0				58.8	45.8	56.9	57.0	54.62	. .	30.000	73.4	67.3	
	30					34.5				13 3 35.57	60.1	49.0	59.0	59.4	56.87	. .				
	31				29.0						60.0	48.0	58.0	58.6	56.15	. .	39.000	73.0	66.5	
	32			22.0							53.8	42.2	52.4	52.8	50.30	. .				
	33		23.5								39.0	27.3	38.2	38.1	35.65	. .				
	†34	Moon, 1st and N. L.	10.0	20.8	33.5	45.3	56.3	8.5	20.3	14 40 44.96	305 24 40.5	39.8	47.0	47.1	43.60	. .	30.050	70.3	65.0	
	35	β Libræ	30.0	41.2	52.3	3.5	14.4	25.5	36.5	15 8 3.34	312 18 36.1	36.6	43.3	44.6	40.12	. .	30.054	69.8	63.8	
	36	α Cor. Bor.	52.0	4.6	16.9	29.0	41.5	53.9	6.3	15 27 29.17	348 20 45.0	46.0	49.0	50.0	47.50	. .	30.054	69.5	63.8	
	37	ζ Ursæ Minoris	15.4	11.5	5.3	58.2	50.8	46.4	39.7	15 48 58.18	39 21 37.2	28.3	37.0	39.0	35.37	. .	30.052	68.8	62.0	
	38	δ Ophiuchi	3.3	14.5	25.3	36.4	47.5	58.4	9.4	16 6 36.40	317 49 34.6	33.3	40.3	42.0	37.55*d*	. .	30.062	68.5	61.6	
	39	α Scorpii	42.0	54.4	6.5	18.5	31.0	43.0	55.4	16 19 18.69	295 3 14.7	13.7	20.0	20.0	17.10	. .	30.050	68.2	62.0	
15	40	β Corvi	..	9.8	21.6	33.3	45.4	57.2	9.0	12 25 39.38	298 35 0.7	0.0	7.2	3.5	2.85*d*	. .	29.912	74.2	75.4	H.
	41	12 Can. Venat.	20.0	34.3	48.7	3.0	17.0	31.0	45.0	12 48 2.71										
	42	Polaris, S. P. (Mic.)							59.5		52 35 42.1	30.4	43.2	40.0	38.92	. .	29.918	73.8	73.5	
	43							50.0			" " 56.0	43.2	55.2	52.7	51.77	. .				
	†44						52.0				" "	"	"	"	"	40.262				
	†45					42.0				13 3 43.94	" "	"	"	"	"	.315				
	†46				40.0						" "	"	"	"	"	.252				
	47			31.0							52 35 52.2	40.6	52.0	51.2	49.00	. .	29.912	74.0	74.6	
	†48		33.0								" "	"	"	"	"	39.708				
	49	α Virginis, (Mic. 4)	46.8	58.0	9.2	20.3	31.8	42.3	52.5	13 16 20.41	310 44 54.8	54.2	62.8	60.5	58.07	41.622				
16	†50	ζ Ursæ Minoris	9.3	4.5	58.0	51.6	45.0	39.8	33.6	15 48 51.66	39 21 43.0	32.0	41.8	42.0	39.70	. .	29.974	75.0	72.8	M.
	51	δ Ophiuchi	58.2	9.5	20.5	31.3	42.2	53.2	4.3	16 5 31.31	. . . .	..	..	..	. .	. .				
	52	α Scorpii	37.0	49.6	1.5	14.0	25.9	48.0	50.0	16 19 13.72	295 3 10.6	8.6	18.0	15.2	13.10*d*	. .	29.974	74.8	71.6	

DATE.	VALUE OF *m.*	*n.*	*c.*	CLOCK. At 16*h.*	H. Rate. 0*s.*
	s.	s.	s.	s.	
June 3	+0.198	+0.396	+0.247	*s* 42.761	*l* .008
4	.198	.396	.247	43.204	.010
6	.198	.396	.247	43.146	.013
15	.198	.396	.247	*s* 47.338	.020
16	+0.198	+0.396	+0.247	*s* 48.384	*l* .021

6 & 7. Observed for declination of N. L. at wire III—S. L. at wire V.
18. Unsteady—observed with cap on.
19. Correction to S. Cusp, for defective illumination, —0″.31.
20. Very unsteady.
22 & 23. Observed for declination of S. L. at wire III—N. L. at wire V.
34 & 50. Cloudy. At times nearly obscured.
44, 45 & 46. Micrometer readings referred to the 2d reading of the circle.
48. Micrometer reading referred to the 3d reading of the circle.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
−0 0.01	−0 0.24	359 45 2.32	61.27	+ 42.78	+0 0.83	18 31 46.34	+ 38 38 40.30	+ 5.24	+ 9.39
+0 0.22	0 41.08	323 55 6.86	. .	.79	0 0.46	19 17 46.78	+ 2 48 4.34	9.14	18.43
. . .	. . .	. . . .	. .	.79	0 0.51	19 43 18.90	. . . .	8.87	. .
+0 0.06	0 36.50	327 8 5.13	. .	.79	+0 0.49	19 47 47.72	+ 6 1 43.11	8.97	+25.76
−0 0.01	0 36.11	330 5 27.25	61.27	43.06	−0 5.04	1 50 35.75	+ 8 59 5.25		
+7 34.55	0 13.33	343 33 37.95	. .	.09	+0 0.63	4 48 58.66	+ 22 27 15.93	. .	. .
−4 5.13	−0 13.80			.09	0 0.63				
+0 0.15	+0 0.24	0 15 54.99	90.22	.17	+0 0.83	12 48 51.06	+ 39 9 4.02	9.18	−77.58
0 0.18	1 33.81	52 37 39.09	. .						
0 0.23	1 14.54	38.27	. .						
0 0.23	1 12.41	37.36	. .	.17	−0 24.99	13 3 55.48	+ 88 29 13.04	65.76	+85.05
0 0.23	1 15.05	37.15	. .						
+0 0.17	1 35.59	37.78	. .						
. . .	. . .	. . . .	. .	.18	+0 0.37	13 17 7.79	. . . .	9.80	. .
−0 0.05	+0 11.01	11 11 52 43	. .	.18	0 1.06	13 41 30.34	+ 50 5 1.46	7.27	−75.40
−0 0.10	−0 19.95	340 17 5.73	. .	.18	0 0.60	13 47 23.74	+ 19 10 14.73	8.90	68.39
+0 0.04	0 19.02	341 5 58.10	. .	.18	0 18.06	14 8 40.89	+ 19 59 7.17	+ 8.36	71.42
−0 0.17	0 26.18	330 27 21.21	88.97	.30	+0 0.51	1 55 39.77	+ 9 20 31.49	. .	. .
−0 21.27	−0 26.49								
+0 25.06	+2 2.84	66 19 9.69	60.53	.31	−0 2.19	2 51 15.39	+ 74 47 11.59	− 3.80	−65.50
+0 0.09	+0 9.94	10 24 42.82	. .	.31	+0 1.03	3 13 22.87	+ 49 18 22.07	+ 15.78	+59.41
−16 35.43	−0 13.70	343 40 18.62	. .	.32	0 0.63	4 53 3.90	+ 22 33 57.34	. .	. .
+14 57.22	0 13.18			.32	0 0.63				
0 0.04	16 0.03	343 46 46.34	59.95	.00	0 0.63	4 57 12.15	+ 22 40 25.64	. .	. .
. . .	. . .	. . . .	. .	.00	0 0.63				
+0 0.16	−1 42.47	298 33 21.46	61.27	.10	+0 0.30	12 26 21.03	− 22 33 0.56	9.87	−59.36
−0 0.10	+1 34.81	52 37 9.86	. .						
0 0.14	1 22.72	12.98	. .						
0 0.16	1 15.62	10.08	. .						
0 0.16	1 13.49	10.20	. .	.11	−0 24.09	13 3 54.59	+ 88 29 10.25	64.19	+85.30
0 0.16	1 16.33	12.32	. .						
0 0.14	1 24.00	14.16	. .						
0 0.10	1 36.87	12.42	. .						
0 0.12	+29 52.25	305 54 35.73	. .	.12	+0 0.35	14 42 36.28	− 15 11 46.29	. .	. .
−0 0.11	−1 2.23	312 17 37.49	. .	.13	0 0.39	15 8 46.86	− 8 48 44.02	9.64	−48.48
+0 0.04	−0 11.70	348 20 35.83	. .	.14	0 0.68	15 28 12.99	+ 27 14 13.81	+ 7.37	50.44
−0 0.10	+0 46.66	39 22 21.93	. .	.14	0 3.32	15 49 44.64	+ 78 15 59.91	− 12.77	49.60
0 0.00	−0 51.58	317 48 45.67	. .	.15	0 0.42	16 6 19.97	− 3 17 36.35	+ 9.29	37.47
0 0.03	2 1.28	295 1 15.79	. .	.15	+0 0.28	16 20 2.12	− 26 5 6.23	10.80	32.32
0 0.00	−1 40.03	298 33 22.82	61.64	47.27	−0 5.65	12 26 21.00	− 22 32 59.57	9.97	−59.58
. . .	. . .	. . . .	. .	.27	+0 0.83	12 48 50.81	. . . .	9.36	. .
+0 0.02	1 33.87	52 37 12.81	. .						
0 0.03	+1 21.87	13.67	. .						
0 4.84	1 14.59	11.20	. .						
0 6.66	1 12.43	10.86	. .	.28	−0 24.09	13 4 7.13	+ 88 29 10.69	57.13	+85.84
0 4.49	1 15.05	11.31	. .						
+0 0.03	1 22.68	11.71	. .						
−0 14.23	+1 35.57	10.34	. .						
+0 51.60	−1 4.16	310 44 45.51	. .	.28	+0 0.38	13 16 8.07	− 10 21 36.88	+ 9.89	−62.12
0 0.00	+0 45.62	38 22 25.32	. .	48.38	0 3.32	15 49 43.36	+ 78 16 3.31	− 12.29	52.43
. . .	. . .	. . . .	. .	.38	0 0.42	16 6 20.11	. . . .	+ 9.25	. .
. . .	−1 58.67	295 1 14.43	61.26	+ 48.39	+0 0.28	16 20 2.39	− 26 5 7.58	+ 10.74	−32.02

NADIR POINTS.				
A.	B.	C.	D.	Means
	June 4	5h.,	30m.	° ′
				179 59
60″3	61″3	62″0	61″3	61″15
60.4	61.2	62.5	61.9	61.50
60.3	61.0	61.8	61.1	61.05
60.6	61.3	61.7	61.6	61.30
60.40	61.20	62.00	61.47	61.27
	June 4	15.5h.		179 59
28.3	29.5	31.4	31.1	30.08
28.7	29.3	31.6	31.0	30.15
28.8	29.5	31.5	31.3	30.27
28.4	29.8	31.3	31.0	30.12
28.5	29.2	31.3	31.3	30.08
28.54	29.46	31.42	31.14	30.14
	June 4	2.5h.		179 59
28.0	29.0	30.3	29.0	29.08
27.8	29.2	30.0	29.2	29.05
27.5	28.8	29.8	28.8	28.72
27.5	28.7	29.5	29.5	28.80
27.5	28.5	30.0	29.3	28.82
27.66	28.84	29.92	29.16	28.89
	June 5			179 59
59.8	60.8	60.7	60.6	60.48
60.2	60.6	60.5	61.0	60.56
59.8	60.9	60.3	60.7	60.42
60.2	60.8	60.8	60.8	60.65
60.0	60.8	60.6	60.9	60.53
60.00	60.78	60.58	60.80	60.53
	June 6	Day.		179 59
60.0	60.0	58.8	60.8	59.90
60.3	59.6	59.8	60.0	59.92
60.0	60.0	59.2	61.0	60.05
60.0	60.0	59.0	60.9	59.98
60.0	60.0	58.8	60.8	59.90
60.06	59.92	59.12	60.70	59.95
	June 6	Night.		179 59
61.0	60.8	58.8	61.8	60.60
62.5	61.8	61.5	63.0	62.20
62.1	61.0	60.0	62.2	61.32
61.5	60.6	59.8	62.2	61.02
61.7	60.8	60.0	62.4	61.22
61.76	61.00	60.02	62.32	61.27
	June	15.		179 59
61.2	60.2	63.2	61.5	61.52
61.5	60.3	63.3	61.8	61.78
61.4	61.0	63.0	61.3	61.68
61.5	60.7	63.0	61.9	61.72
61.2	60.3	62.8	61.5	61.45
61.36	60.54	63.06	61.60	61.64

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Venus .	− 0 0.64	
Sun . .	. . . .	15 44.83
Venus .	− 0 0.63	0 10.29
Sun . .	. . . .	15 46 58
Moon .	+ 1 7.85	

June 3. Error of Runs, +0″62.
" 4. do. do. −0.51; Mic. coin. 40r012.
" 5. do. do. −0.30; do. do. 40.113.
" 6. do. do. +0.52; do. do. 40.113.
" 15. do. do. −0.10; do. do. 40.122.
" 4, 2*h*. 30*m*. After the observation for Nadir Point, adjusted the alidade circle.

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	TH At.
			s.	s.	s.	s.	s.	s.	s.	H. M. s.	° ′ ″	″	″	″	″	Revs.	In.	°
June 17	1	12 Canum Venat. (Mic. 4)	19.0	33.4	47.5	1.6	15.8	30.0	44.0	12 48 1.61	0 15 6.0	4.5	9.2	8.8	7.15	40.585	30.060	76.2
	2	Polaris, S. P. (Mic. 4)						52.0			52 35 55.0	43.0	55.3	53.6	51.72	. .		
	†3						50.0				" " "	"	"	"	"	40.186	30.060	76.2
	†4					40.0					" " "	"	"	"	"	40.215		
	†5				35.5					13 7 9.60	" " "	"	"	"	"	40.150		
	6			28.5							51.8	41.5	52.5	51.2	49.25	. .	30.064	76.0
	†7		32.0								" " "	"	"	"	"	39.532		
	8	α Virginis	45.5	57.0	7.8	19.1	30.2	41.3	52.5	13 16 19.06	310 45 1.8	3.5	12.1	8.5	6.48	41.310	30.062	75.1
	9	α Cor. Bor.	46.4	59.2	11.4	23.4	36.0	48.2	0.5	15 27 23.59	348 20 42.8	45.2	50.0	48.0	46.50	. .	30.074	73.4
	10	α Serpentis	22.0	33.3	44.2	55.0	6.2	17.2	28.3	15 35 55.17	328 1 42.7	46.1	52.4	50.2	47.85	. .	30.076	73.2
	11	α Lyræ	15.0	29.2	43.0	57.2	11.3	25.6	39.7	18 30 57.29	359 45 3.5	1.4	6.9	4.4	4.05	. .		
18	12	α Cor. Bor.	46.0	58.3	10.4	23.0	35.1	47.4	59.9	15 27 22.87	348 20 41.0	41.8	47.0	45.0	43.70	. .	29.986	74.5
	13	α Serpentis	21.3	32.2	43.2	54.3	5.3	16.4	27.5	15 35 54.31	328 1 41.0	42.8	50.5	47.8	45.52	. .	29.986	74.2
	14	ζ Ursæ Minoris . . .	9.0	4.0	56.5	51.3	44.5	39.3	32.6	15 48 51.03	39 21 39.0	29.8	39.5	39.2	36.88	. .		70.5
	15	δ Ophiuchi	57.2	8.2	19.2	30.3	41.0	52.2	3.2	16 5 30.19	317 49 30.2	30.5	38.6	38.2	34.38	. .	29.986	70.5
	16	α Scorpii	36.0	48.3	0.4	12.6	24.0	37.1	49.3	16 19 12.53	295 3 6.3	5.5	15.2	12.5	9.88	. .	29.986	73.7
	17	α Aurigæ	42.2	58.3	14.0	29.5	45.0	0.8	16.2	5 4 29.43	6 56 9.9	4.5	13.5	12.1	10.00	. .	29.910	76.6
19	†18	Sun, 1st & S.L. (Mic. 2)	28.2	42.8	54.2	6.4	18.2	30.1	42.4	5 49 6.04	344 32 17.9	20.1	24.1	21.2	20.82	39.346		
	†19	Sun, 2d & N. L. (Mic. 6)	48.1	0.2	12.1	24.0	36.0	48.2	0.0	5 51 24.09	" "	"	"	"	"	43.527	29.886	77.5
	†20	α Cor. Bor.	44.8	57.5	9.8	22.0	34.0	46.2	58.9	15 27 21.89	348 20 41.3	45.2	41.0	49.2	44.18	. .	29.810	76.2
	†21	α Serpentis	20.2	31.3	42.2	53.2	..	..	..	15 35 36.72	328 1 39.9	43.8	51.4	47.6	45.68*d*	. .		
	†22	ε Ursæ Minoris, (Mic. 4)	1.5	24.0	..	7.0	28.0	50.3	10.5	17 1 20.22	43 22 31.0	24.1	23.0	32.1	30.05*d*	40.030	29.812	75.0
	23	α Herculis	16.0	27.2	38.3	49.8	1.2	12.2	24.0	17 6 49.80	335 40 57.8	61.6	65.2	62.6	61.80	. .	29.810	75.0
	24	α Ophiuchi	26.0	37.1	48.2	0.0	10.8	22.0	33.2	17 26 59.61	333 47 26.0	27.5	33.0	30.2	29.18	. .	29.808	75.0
	25	γ Draconis	20.4	38.5	56.0	13.5	31.0	48.8	6.2	17 52 13.49	12 36 44.3	39.5	48.5	46.7	44.75	. .	29.802	74.3
21	†26	ε Ursæ Minoris . . .	0.5	23.5	45.0	6.3	27.3	50.0	11.2	17 2 6.26	43 22 23.2	15.1	22.5	16.0	19.20	. .	29.990	69.5
	†27	α Ophiuchi	25.6	36.9	47.9	59.1	10.2	21.9	32.9	17 26 59.21	333 47 26.5	25.5	29.8	31.5	28.32	. .	29.990	68.5
	28	γ Draconis	20.5	38.3	55.7	13.0	30.8	48.3	6.4	17 52 13.29	12 36 43.0	35.2	43.8	43.2	41.30	. .	29.980	67.3
	29	μ^1 Sagittarii	10.8	22.6	34.1	46.0	57.5	9.6	21.0	18 3 45.94	300 2 27.0	25.4	33.0	31.0	29.10	. .		67.2
22	†30	α Serpentis	20.1	31.0	42.2	53.0	4.3	15.4	26.2	15 35 53.17	328 1 42.7	45.2	52.1	49.9	47.48*d*	. .	30.130	66.5
	†31	ζ Ursæ Minoris, (Mic. 4)	8.0	2.2	55.5	49.8	43.5	37.5	30.5	15 48 49.57	39 22 32.3	23.9	32.1	32.5	30.22*d*	38.447	30.130	66.0
	32	β^1 Scorpii, (Mic. 4) . .	7.2	19.0	30.4	42.0	53.8	5.7	17.0	15 55 42.16	301 44 55.6	57.3	64.0	63.3	60.05*d*	30.140	30.128	65.8
	33	α Scorpii	34.4	47.2	59.5	11.2	23.4	36.0	48.0	16 19 11.39	295 3 32.5	34.1	42.3	40.3	37.30	39.420	30.126	64.8
	†34	γ Draconis	20.3	38.2	55.2	13.6	31.0	48.2	6.2	17 52 13.24	12 36 49.1	43.4	52.8	52.0	49.32	. .	30.116	62.5
	35	μ^1 Sagittarii	..	23.2	34.4	46.0	58.0	9.2	21.2	18 3 52.00	300 2 30.3	31.0	37.7	37.5	34.12	. .	30.108	62.0
	36	δ Ursæ Minoris, (Mic.)	56.0								47 41 59.5	49.3	57.6	58.8	56.42	38.932	30.110	62.0
	37			5.5							" " "	"	"	"	"	38.729		
	38				6.0						" " "	"	"	"	"	38.648		
	39					13.0				18 19 39.03	" " "	"	"	"	"	38.580		
	40						14.2				" " "	"	"	"	"	38.603		
	41							21.5			59.0	50.1	58.0	59.1	56.55	38.742		
	42	α Lyræ	13.2	27.4	41.4	55.2	9.2	23.3	37.3	18 30 55.29	359 45 5.0	4.7	9.2	8.6	6.88	. .		
	43	ζ Aquilæ	58.4	10.0	21.0	32.0	43.2	54.8	6.0	18 56 32.20	334 45 15.5	18.8	21.2	22.5	19.50	. .	30.104	61.5
	44	η Lyræ	0.4	14.0	28.0	42.1	56.0	10.0	24.1	19 7 42.09	359 59 28.2	28.1	33.1	34.4	30.95	. .		
	45	δ Aquilæ	23.5	34.6	45.5	56.2	7.0	18.5	29.1	19 16 56.34	323 55 53.0	58.4	60.5	61.8	58.42	. .	30.100	60.8
	46	γ Aquilæ	35.0	46.2	57.1	8.2	19.8	30.8	42.0	19 38 8.44	331 21 31.5	34.0	38.0	38.7	35.55	. .	30.092	60.6
	47	β Aquilæ	24.0	35.1	46.0	57.1	2.2	19.2	30.1	19 46 57.10	327 8 39.8	44.0	49.3	48.2	45.32	. .	30.090	60.6
23	48	α Ophiuchi	26.0	37.2	48.5	59.9	10.9	22.1	33.1	17 26 59.67	333 47 31.2	30.5	37.3	29.0	31.50	. .	30.134	68.0
	†49	γ Draconis	20.8	38.9	56.0	13.8	31.1	49.0	6.6	17 52 13.74	12 36 46.2	37.0	47.0	48.0	44.55	. .	30.124	66.8
	†50	μ^1 Sagittarii	11.0	23.0	34.5	46.4	58.0	10.0	21.7	18 3 46.37	300 2 22.0	24.5	32.0	28.2	26.68	. .	30.120	66.0
	†51	ζ Aquilæ	..	..	20.0	31.2	42.5	54.0	5.3	18 57 42.60	. . . .	..	..	..	..	. .		
	52	γ Aquilæ	..	..	..	8.9	20.0	31.0	42.3	19 38 25.55	. . . .	..	..	..	..	. .		

DATE.	VALUE OF m.	n.	c.	CLOCK. At 16*h*.	H. Rate. 0*s*.
	s.	s.	s.	s.	
June 17	+0.198	+0.396	+0.247	*s* 48.420	*l* .025
18	0.198	0.396	0.247	49.390	.020
19	0.198	0.396	0.247	50.374	.028
21	0.198	0.396	0.247	50.731	.008
22	0.198	0.396	0.247	50.529	.004
23	+0.198	+0.396	+0.247	*s* 50.170	*l* .002

3, 4 & 5. Micrometer readings referred to the 1st reading of circle.
7. Micrometer reading referred to the 2d circle reading.
18 & 19. Observed for declination of S. L. at wire III—N. L. at wire IV.
20, 22, 26, 27, 30, 49 and 50. Unsteady.
21. Unsteady. Lost in a cloud.
26. Badly defined, and very unsteady.
31. Observed for declination at wire IV.
34. Observed for declination at wire VII.
50. Observations for declination not good. Circle moved.
51. Added 1*s*. to recorded transit.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 14.80	+ 0 0.25	0 15 22.20	58.16	+ 48.34	+ 0 0.83	12 48 50.78	+ 39 9 3.29	+ 9.39	−79.12
− 0 0.10	1 21.92	52 37 13.54	. .						
+ 0 6.19	1 14.93	12.84	. .						
0 7.19	1 12.77	11.68	. .						
+ 0 4.94	1 15.41	13.07	. .	.35	− 3 51.31	13 4 6.64	+ 88 29 7.85	55.56	+85.00
− 0 0.10	1 23.06	12.27	. .	•					
− 0 16.27	+ 1 36.04	9.02	. .						
+ 0 39.76	− 1 4.73	310 44 24.97	. .	.35	+ 0 0.38	13 17 7.79	− 10 21 37.40	9.91	−62.22
0 0.03	0 11.58	348 20 34.95	. .	.41	0 0.68	15 28 12.68	+ 27 14 16.04	7.41	52.75
+ 0 0.17	0 35.06	328 1 12.92	. .	.42	0 0.49	15 36 44.08	+ 6 54 54.05	8.76	−46.45
− 0 0.01	0 0.24	359 45 3.80	. .	.48	0 0.83	18 31 46.60	+ 38 38 44.89	5.03	+ 5.06
+ 0 0.07	0 12.53	348 20 31.24	59.56	49.38	0 0.68	15 28 12.93	+ 27 14 10.93	7.41	−52.96
+ 0 0.35	− 0 36.20	328 1 9.67	. .	.38	0 0.49	15 36 44.18	+ 6 54 49.36	+ 8.76	46.58
− 0 0.16	+ 0 45.55	39 22 22.27	. .	.39	0 8.32	15 49 43.73	+ 78 16 1.96	− 12.17	52.97
0 0.45	− 0 52.09	317 48 42.34	. .	.39	0 0.42	16 6 20.00	− 3 17 37.97	+ 9.24	38.59
0 0.04	− 1 59.00	295 1 10.84	. .	.40	0 0.28	16 20 2.21	− 26 5 9.47	10.71	−31.97
0 0.33	+ 0 56.61	6 56 16.28	. .	50.12	0 0.96	5 6 20.51	+ 45 49 55.97	16.54	+25.39
−15 7.79	− 0 13.00	344 32 46.43	59.25	.13	0 0.64	5 51 5.83	+ 23 26 26.43	. .	. .
+16 24.57	0 12.55								
+ 0 0.04	0 11.48	348 20 32.74	. .	.38	0 0.68	15 28 12.95	+ 27 14 12.74	7.42	−53.15
− 0 0.01	− 0 34.65	328 1 11.22	. .	.38	+ 0 17.02	15 36 44.12	+ 6 54 51.02	+ 8.76	46.71
− 0 4.28	+ 0 52.63	43 23 18.40	. .	.40	− 0 8.65	17 2 1.97	+ 82 16 58.40	− 30.66	29.33
+ 0 0.16	− 0 25.15	335 40 36.81	. .	.40	+ 0 0.56	17 7 40.76	+ 14 34 16.81	+ 7.90	23.76
+ 0 0.08	− 0 27.39	333 47 1.87	. .	.41	0 0.54	17 28 50.56	+ 12 40 41.87	7.90	18.42
− 0 0.12	+ 0 12.46	12 36 57.09	. .	.42	0 1.09	17 53 5.00	+ 51 30 37.09	+ 2.48	10.29
− 0 0.32	+ 0 54.01	43 23 12.89	60.93	.74	0 4.96	17 2 1.96	+ 82 16 51.21	− 30.50	29.92
+ 0 0.12	− 0 28.18	333 47 0.26	. .	.74	0 0.49	17 27 50.44	+ 12 40 38.58	+ 7.90	18.81
− 0 0.17	+ 0 12.83	12 36 53.96	. .	.75	0 1.09	17 53 5.13	+ 51 30 32.88	2.48	10.95
+ 0 0.12	− 1 38.83	300 0 50.39	. .	.76	0 0.31	18 4 37.01	− 21 5 31.29	10.50	6.94
− 0 0.05	− 0 35.83	328 1 11.60	57.75	.53	0 0.49	15 36 44.19	+ 6 54 53.10	+ 8.77	47.10
− 0 56.76	+ 0 47.07	39 22 31.13	. .	.53	0 3.32	15 49 43.42	+ 78 16 2.63	− 11.92	53.98
+ 0 1.49	− 1 32.63	301 43 28.91	. .	.53	0 0.32	15 56 33.01	− 19 22 49.59	+ 10.25	37.91
− 0 23.50	− 2 2.50	295 2 11.30	. .	.53	0 0.28	16 20 2.20	− 26 5 7.20	10.72	31.84
− 0 0.15	+ 0 12.95	12 37 2.12	. .	.54	+ 0 1.09	17 53 4.87	+ 51 30 43.62	2.47	11.28
+ 0 0.09	− 1 39.67	300 0 54.54	. .	.54	− 0 5.57	18 4 36.97	− 21 5 23.96	+ 10.48	6.95
− 0 40.05	+ 0 53.55	47 42 9.92	. .						
0 47.03	0 59.14	8.53	. .						
0 48.82	1 2.50	10.10	. .						
0 52.16	1 3.51	7.77	. .	.54	+ 1 42.98	18 22 12.55	+ 86 35 50.52	− 87.93	− 0.47
0 51.17	1 2.55	7.80	. .						
0 46.56	+ 0 59.32	8.78	. .						
0 0.02	− 0 0.24	359 45 6.66	. .	.54	0 0.83	18 31 46.66	+ 38 38 48.16	+ 4.97	+ 3.49
− 0 0.07	0 27.29	334 44 52.28	. .	.54	0 0.55	18 58 23.29	+ 13 38 33.78	7.77	9.62
+ 0 0.10	0 0.01	359 59 30.84	. .	.54	0 0.83	19 8 33.46	+ 38 53 12.34	4.98	15.21
− 0 0.20	0 42.14	323 55 16.48	. .	.54	0 0.46	19 17 47.34	+ 2 48 57.98	8.77	15.04
− 0 0.12	0 31.60	331 21 4.05	. .	.54	0 0.52	19 38 59.50	+ 10 14 45.55	8.20	21.80
+ 0 0.05	0 37.39	327 8 7.98	. .	.55	0 0.49	19 47 48.14	+ 6 1 49.48	8.56	+22.05
− 0 0.05	− 0 28.28	333 47 3.27	60.60	.17	0 0.54	17 27 50.38	+ 12 40 41.88	7.89	−19.20
− 0 0.07	+ 0 12.87	12 36 57.35	. .	.17	0 1.09	17 53 5.00	+ 51 30 36.00	2.47	11.61
+ 0 0.06	− 1 39.21	300 0 47.53	. .	.17	+ 0 0.31	18 4 36.85	. . . .	10.47	− 6.97
. . .	. . .	. . . . .	. .	.18	− 0 10.74	18 58 23.04	. . . . .	7.76	. .
. . .	. . .	. . . . .	. .	50.18	− 0 16.16	19 38 59.57	. . . . .	+ 8.19	. .

NADIR POINTS.				
A.	B.	C.	D.	Means
	June	16,	Night.	° ′
				179 59
62″0	59″5	61″1	61″0	60″90
63.0	60.8	62.7	61.0	61.88
63.0	59.8	61.5	61.0	61.32
62.2	59.8	60.0	61.8	61.18
62.0	59.8	61.0	61.4	61.05
62.42	59.94	61.46	61.24	61.26
	June	17.		179 59
57.0	57.5	59.0	58.3	57.95
57.1	58.0	59.0	58.3	58.10
57.0	58.0	59.3	58.8	58.28
56.8	58.0	59.1	58.4	58.08
57.2	58.5	59.1	58.8	58.40
57.02	58.00	59.10	58.52	58.16
	June	18,	Night.	179 59
60.0	60.0	61.0	60.8	60.45
60.0	58.5	59.0	59.8	59.32
59.7	58.9	59.7	60.0	59.58
58.5	58.6	59.0	59.8	58.97
59.7	58.8	59.7	59.8	59.50
59.58	58.96	59.68	60.04	59.56
	June	19.		179 59
57.8	58.4	61.5	59.5	59.30
57.5	58.4	61.2	59.6	59.18
57.5	58.5	61.4	59.5	59.22
57.5	58.3	61.2	59.6	59.15
57.5	58.8	61.3	59.9	59.38
57.4	58.5	61.3	60.0	59.30
57.53	58.48	61.32	59.68	59.25
	June	21,	Night.	179 59
62.0	60.8	62.0	63.2	62.00
60.8	60.3	61.4	62.4	61.22
60.6	60.0	60.3	61.4	60.58
60.8	60.0	60.3	61.4	60.62
59.8	59.3	60.0	61.8	60.23
60.80	60.08	60.80	60.04	60.93
	June	22.		179 59
56.6	57.8	59.3	57.5	57.80
56.3	57.5	59.5	58.0	57.82
56.3	57.3	59.7	57.8	57.78
56.2	57.1	59.1	58.0	57.60
56.4	57.3	58.8	58.0	57.62
56.6	57.5	59.5	58.0	57.90
56.5	57.2	59.0	58.3	57.75
56.7	57.5	58.9	58.0	57.78
56.6	57.2	59.0	68.2	57.75
56.6	57.5	58.9	58.0	57.75
56.48	57.39	59.17	57.98	57.75
	June	23,	Night.	179 59
60.3	60.2	59.9	61.7	60.52
60.1	60.0	59.9	61.7	60.42
60.0	59.8	61.0	61.6	60.60
60.3	59.8	60.2	61.6	60.47
59.8	60.2	62.0	62.0	61.00
60.10	60.00	60.60	61.72	60.60

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Sun . .	. . . .	15 46.40

June 17. Error of Runs, +0.38; Mic. coin., { 40r154. / 40.005, for Polaris.
" 18. do. 0.84;
" 19. do. 0.47; " 40.154.
" 21. do. 0.74;
" 22. do. 0.62; " 40.097.
" 23. do. +0.30.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THERS	
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.	Ex
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°
June 23	†1	α Aquilæ	56.0	7.0	17.8	28.8	40.0	50.9	2.0	19 42 28.93	. . . .	..	..	..	..	. .			
	†2	β Aquilæ	24.5	35.5	46.5	57.5	8.3	19.8	30.8	19 46 57.58	327 8 45.8	47.1	50.8	50.2	48.47	. .	30.120	64.3	58.
	†3	α² Capricorni	9.3	20.9	31.5	43.0	54.1	5.5	16.7	20 8 43.00	. . . .	..	..	..	..	. .			
24	†4	Sun, 1st & S. L. (Mic.3)	18.0	30.3	42.1	54.2	6.0	18.0	30.0	6 9 54.09	344 25 24.0	25.0	30.1	28.7	26.95d	34.920	30.208	70.2	76.
	†5	Sun, 2d & N. L. (Mic.6)	55.8	48.0	59.6	11.6	23.7	35.8	47.5	6 12 11.71	344 45 15.0	17.6	20.8	19.1	18.12	34.920	30.210	70.5	77.
	6	α Canis Majoris . . .	57.4	..	20.4	32.0	43.0	54.2	6.0	6 37 35.50	304 36 56.8	58.5	67.1	65.5	61.97	. .	30.206	71.0	78.
	†7	α² Libræ	..	..	22.4	33.3	44.8	57.1	8.8	14 41 45.28	305 43 30.3	31.8	39.9	40.1	35.52d	. .	30.128	70.0	67.
	8	β Ursæ Minoris . . .	16.5	58.5	40.0	22.0	3.0	45.2	26.5	14 50 21.71	35 52 57.4	47.0	56.0	56.1	54.12	. .	30.128	70.0	67.
	9	β¹ Scorpii	7.2	19.2	30.8	42.2	53.8	5.4	17.0	15 55 42.23	301 44 57.9	60.8	68.3	67.8	63.70d	. .	30.128	69.5	65.
	†10	α Scorpii	35.0	47.5	59.2	11.2	23.5	36.0	48.0	16 19 11.49	295 3 11.0	11.8	20.1	19.0	15.47	. .	30.124	69.3	65.
	11	α Herculis	16.0	27.0	38.5	50.0	1.1	12.2	23.8	17 6 49.80	335 41 3.3	6.5	11.5	10.5	7.95	. .	30.110	68.8	65.
	12	λ Ursæ Minoris, (Mic.4)			38.0						49 56 16.2	5.0	16.0	15.5	13.17	. .	30.082	66.6	63.
	†13										"	"	"	"	"	40.051			
	†14										"	"	"	"	"	40.020			
	15					47.0				20 15 45.00	11.4	0.7	12.3	12.0	9.10	. .	30.082	67.6	63.
	†16										"	"	"	"	"	40.162			
	†17										"	"	"	"	"	40.175			
	18						50.0				15.0	4.2	15.4	14.8	12.35	. .	30.080	66.4	63.
	†19	α Cygni	36.5	52.0	7.4	23.0	38.2	53.8	9.0	20 35 22.84	5 50 17.5	13.4	19.2	21.7	17.95	. .	30.080	66.2	62.7
26	20	α Herculis	..	..	38.7	50.0	..	13.0	24.0	17 7 1.42	333 41 4.2	5.8	9.2	10.7	7.48	. .	29.916	75.0	71.0
	21	α Ophiuchi	26.0	37.5	4.8	59.5	10.6	22.0	33.5	17 26 59.64	333 47 30.5	30.2	35.5	34.2	32.60	. .	29.916	75.0	71.5
	†22	γ Ophiuchi	50.0	1.1	12.4	23.0	33.5	44.9	56.0	17 39 22.93	323 53 20.8	21.2	26.8	25.3	23.52	. .		74.5	71.0
	23	γ Draconis	20.9	38.7	55.8	14.0	31.2	49.0	6.5	17 52 13.73	12 36 53.4	46.8	54.8	54.5	52.37	. .			
	24	μ¹ Sagittarii	..	..	34.8	46.5	58.0	9.7	31.4	18 3 58.08	. . . .	..	..	..	..	. .			
	25	α Lyræ	..	27.8	41.4	55.0	9.3	23.7	37.8	18 31 2.50	. . . .	..	..	..	..	. .			
	26	Herculis, 6387 . .	39.5	51.0	3.0	14.5	26.0	38.0	49.5	18 38 14.50	. . . .	..	..	..	..	. .			
	27	β Lyræ	..	10.0	22.5	36.0	..	2.2	15.0	18 43 41.14	354 17 49.7	48.8	53.0	53.4	51.22	. .	29.916	73.8	69.5
	28	ζ Aquilæ	..	10.0	21.0	32.1	43.2	55.0	6.1	18 57 37.90	323 55 56.2	58.8	60.6	63.6	59.80	. .	29.900	73.0	69.2
	29	δ Aquilæ	23.7	34.6	45.3	56.5	7.4	18.4	29.5	19 16 56.49	. . . .	..	..	..	..	. .			
	30	γ Aquilæ	35.3	46.5	57.5	8.7	19.5	30.9	42.0	19 38 8.63	331 21 34.0	34.5	38.8	40.2	36.87	. .			
	31	α Aquilæ	..	..	..	28.6	38.8	50.8	2.0	19 42 45.05	. . . .	..	..	..	..	. .			
	32	β Aquilæ	24.0	35.7	46.5	57.5	8.3	19.5	30.4	19 46 57.41	327 8 32.6	44.2	49.2	50.5	46.62	. .	29.984	72.8	68.2
July 1	33	12 Can. Ven. (Mic.) . .	..	..	..	..	8.2	22.9	37.0	12 48 22.70	0 14 56.9	63.3	62.4	61.2	60.95d	40.905			
	†34	Polaris, S. P. . . .							2.0		52 35 40.4	38.8	46.1	42.4	41.92	. .			
	35							55.0			51.2	49.9	56.0	52.2	52.32	. .	29.816	78.0	80.7
	36						54.5			13 0 18.42	58.2	56.4	62.4	59.0	59.00	. .			
	37					45.5					61.3	59.7	66.8	61.7	62.37	. .			
	38				41.0						"	"	"	"	"	40.017			
	39			32.5							50.0	47.7	53.0	50.5	50.30	. .	29.820	77.8	80.0
	40	α Virginis	38.3	49.8	1.0	12.1	28.0	34.3	45.4	13 16 11.99	310 45 3.1	9.8	14.0	9.5	9.10	41.290			
	†41	α Scorpii	29.2	42.0	54.2	6.4	18.2	30.8	43.0	16 18 6.26	294 42 2.5	10.4	14.9	9.3	9.27	41.290	29.846	76.3	74.0
6	42	Sun, 1st & S.L. (Mic.2)	48.7	0.8	12.4	24.2	36.3	48.0	0.2	6 59 24.37	343 47 43.8	43.1	42.8	38.7	42.10	40.109			87.4
	43	Sun, 2d & N.L. (Mic.6)	5.9	18.0	29.4	41.2	53.0	5.4	17.0	7 1 41.41	" " "	"	"	"	"	44.234	29.892	81.5	89.3
	†44	Mercury, 1st & N. L.	33.3	45.0	56.8	9.0	20.4	32.5	44.4	8 16 8.77	342 38 36.7	37.8	36.6	31.1	35.55	. .	29.878	82.6	90.1
	45	Mercury, S. L. (Mic.)	..	..	..	..	..	..	..		" " "	"	"	"	"	39.953			
	46	Polaris, S. P. . .					55.5				52 35 68.0	56.8	61.3	57.5	60.90	. .	29.840	84.0	86.0
	47					47.0					71.5	58.7	63.8	59.2	63.30	. .			
	48				43.5					13 10 42.80	69.2	57.9	61.6	57.6	61.57	. .	29.840	84.0	86.0
	49			33.6							60.8	48.4	53.2	50.3	53.17	. .			
	50		34.5								49.3	36.3	42.5	38.8	41.67	. .	29.840	84.0	85.0
	51	α Bootis	4.9	16.7	28.0	40.0	51.4	3.1	14.8	14 7 39.84	. . . .	..	..	..	..	. .			
	52	ε Bootis	40.1	52.2	5.0	17.4	29.0	41.5	54.2	14 37 17.06	. . . .	..	..	..	..	. .			

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 13h.	0s.
	s.	s.	s.	s.	
June 24	+0.198	+0.396	+0.247	s 50.453	l .002
26	0.198	0.396	0.247	50.264	.002
July 1	0.213	0.298	0.330	55.312	.034
6	+0.213	+0.298	+0.330	s 60.052	l .021

1, 2, 19, 22, 44. Unsteady.
3. At times nearly obscured.
4, 5. Observed for declination of S. L. at wire III, N. L. at wire V.
7. Observed transit at wires III, IV, V increased one second.
10. Confused and unsteady.
13, 14. Micrometer observations taken at 9*m*. 30*s*., and 12*m*. 30*s*., and referred to the first circle reading.
16, 17. Micrometer observations taken at 18*m*. 45*s*., and 21*m*. 45*s*., and referred to the second circle reading.
34. Observation for declination at wire VII, not so good as the rest.
41. Observed in sweeping, and copied from zone book. Too bright to be observed with accuracy.
44. Very steady.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
. . .	. . .	. . . .	. .	+ 50.18	+ 0 0.51	19 43 19.62	. . . .	+ 8.45	. .
+ 0 0.02	− 0 37.17	327 8 11.32	. .	.18	0 0.49	19 47 48.25	+ 6 1 49.97	8.54	+21.86
. . .	. . .	. . . .	. .	.18	0 0.36	20 9 33.63	. . . .	9.95	. .
− 8 49.36	0 13.53	344 32 8.38	+ 59.04	50.44	+ 0 0.64	6 11 53.98	+ 23 25 48.19	. .	. .
+ 2 47.54	0 12.95								
− 0 0.07	1 20.19	304 35 41.71	. .	.44	− 0 3.32	6 38 22.62	− 16 30 38.08	+ 10.16	− 7.02
0 0.00	− 1 18.39	305 42 17.13	60.12	.45	− 0 10.99	14 42 25.34	− 15 24 3.73	+ 10.00	52.19
+ 0 0.07	+ 0 40.14	35 53 34.33	. .	.45	+ 0 2.59	14 51 14.75	+ 74 47 13.46	− 2.77	69.83
0 0.00	− 1 31.42	35 43 32.28	. .	.45	0 0.32	15 56 33.00	− 19 22 48.19	+ 10.25	37.94
− 0 0.01	2 0.82	295 1 14.64	. .	.46	0 0.28	16 20 2.23	− 26 5 6.22	10.72	31.80
+ 0 0.06	− 0 25.62	335 40 42.33	. .	.46	0 0.56	17 7 40.82	+ 14 34 21.46	7.76	−24.72
+ 0 0.05	+ 1 4.22	49 57 17.44	. .						
− 0 2.20	1 5.76	16.73	. .						
− 0 3.27	1 7.04	16.84	. .						
+ 0 0.05	1 7.04	16.73	. .	.48	+ 0 33.24	20 17 8.72	88 50 56.41	248.39	+41.04
0 1.51	1 7.35	17.97	. .						
0 1.95	1 6.43	17.48	. .						
0 0.05	1 5.36	17.76	. .						
0 0.05	+ 0 5.83	5 50 23.84	. .	.48	+ 0 0.94	20 36 14.26	+ 44 44 2.97	4.89	+43.73
0 0.26	− 0 25.18	335 40 42.56	60.13	.27	− 0 10.76	17 7 40.93	+ 14 34 21.68	7.76	−24.72
0 0.14	0 26.02	333 47 6.72	. .	.27	+ 0 0.54	17 27 50.45	+ 12 40 45.84	7.87	18.74
+ 0 0.41	− 0 40.60	323 52 43.31	. .	.27	0 0.43	17 40 13.63	+ 2 46 22.43	8.64	14.77
− 0 0.26	+ 0 12.45	12 37 4.56	. .	.27	+ 0 1.09	17 53 5.09	+ 51 30 43.68	2.47	−12.58
. . .	. . .	. . . .	. .	.27	− 0 11.41	18 4 36.94	. . . .	10.44	. .
. . .	. . .	. . . .	. .	.27	− 0 6.19	18 31 46.58	. . . .	4.94	. .
. . .	. . .	. . . .	. .	.27	+ 0 0.61	18 39 5.38	. . . .	7.07	. .
+ 0 0.05	− 0 5.58	354 17 45.69	. .	.27	− 0 4.50	18 44 26.91	+ 33 11 24.81	5.65	+ 5.34
. . .	. . .	. . . .	. .	.27	− 0 5.10	18 58 23.07	. . . .	7.72	. .
+ 0 0.30	0 40.70	323 55 19.40	. .	.27	+ 0 0.46	19 17 47.22	+ 2 48 58.52	8.71	14.36
− 0 0.18	− 0 30.58	331 21 6.11	. .	.27	+ 0 0.52	19 38 59.42	+ 10 14 45.23	8.13	21.15
. . .	. . .	. . . .	. .	.28	− 0 16.08	19 43 19.25	. . . .	8.40	. .
+ 0 0.07	− 0 36.15	327 8 10.47	. .	.28	+ 0 0.49	19 47 48.18	+ 6 1 49.59	8.49	21.28
0 27.64	+ 0 0.24	0 15 28.83	60.65	55.27	− 0 27.41	12 48 50.56	+ 39 9 8.08	9.63	80.10
0 0.01	1 32.68	57 37 14.54	. .						
0 0.02	1 20.67	12.97	. .						
0 0.02	1 13.46	12.44	. .						
+ 0 0.02	1 11.20	13.55	. .	.28	+ 3 4.24	13 4 17.97	+ 88 29 8.36	44.01	+86.06
− 0 3.31	1 13.95	13.01	. .						
+ 0 0.02	+ 1 21.45	11.73	. .						
0 40.85	− 1 3.92	310 44 46.03	. .	.29	0 0.49	13 17 7.67	− 10 21 35.37	10.04	−63.01
+21 1.03	1 57.61	295 1 11.69	. .	.39	0 0.45	16 19 2.08	− 26 5 9.71	10.72	−31.64
−14 37.96	0 13.56	348 48 34.96	63.00	59.95	0 0.70	7 1 33.54	+ 22 42 11.21	. .	. .
+16 50.34	0 13.09								
+ 0 0.16	0 14.67	342 38 18.17	. .	.92	0 0.25	8 17 9.62	+ 21 31 54.42	. .	. .
0 5.41	− 0 14.67								
0 0.00	+ 1 12.70	52 37 13.60	. .						
0 0.00	1 10.53	13.83	. .						
0 0.00	1 13.26	14.83	62.30	+ 60.03	7 16.83	13 4 26.00	+ 88 29 9.41	39.48	+85.97
0 0.02	1 20.84	14.01	. .						
− 0 0.05	+ 1 33.77	15.44	. .						
. . .	. . .	. . . .	. .	.05	0 0.67	14 8 40.56	. . . .	8.66	. .
. . .	. . .	. . . .	. .	.06	+ 0 0.74	14 38 17.86	. . . .	+ 8.16	. .

NADIR POINTS.				
A.	B.	C.	D.	Means
	June	24,	Day.	° ′ 179 59
57″5	58″1	60″4	59″9	58″98
57.5	58.2	60.3	59.8	59.95
57.6	58.4	60.6	59.9	59.12
57.6	58.1	60.6	60.2	59.12
57.4	58.2	60.4	60.2	59.05
57.52	58.20	60.46	60.00	59.04
	June	24,	Night.	179 59
58.0	59.7	60.6	62.5	60.20
59.0	60.0	61.0	61.3	60.32
58.4	59.4	60.9	61.5	60.05
58.0	59.0	61.0	61.9	59.98
58.0	59.2	61.1	62.0	60.08
58.28	59.46	60.92	61.84	60.12
	June	26,	Night.	179 59
60.2	59.5	60.2	61.3	60.30
60.2	59.5	60.8	61.0	60.38
59.8	58.6	60.5	59.8	59.67
60.1	59.0	61.2	60.9	60.30
60.0	58.8	61.0	60.2	60.00
60.06	59.08	60.74	60.64	60.13
	July	1.		179 59
56.4	65.2	61.0	60.2	60.70
56.4	65.2	61.3	60.0	60.72
56.5	65.2	61.1	59.8	60.65
56.1	64.8	61.0	60.0	60.48
56.2	65.0	61.7	60.0	60.72
56.32	65.08	61.22	60.00	60.65
	July	6,	Day.	179 59
66.4	66.8	61.4	57.3	62.98
66.4	66.8	61.4	57.2	62.95
66.3	66.6	61.8	57.2	62.97
66.4	66.7	62.0	57.1	63.05
66.5	66.8	61.5	57.5	63.08
66.40	66.74	61.62	57.26	63.00

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Sun . .	. . . .	15 44.82
Sun . .	. . . .	15 44.38
Mercury	+ 0 0.25	0 2.68

June 23. Error of Runs, +0″30.
" 24. do. do. 0.20. Mic. coincidence, 40r116.
" 26. do. do. +0.90.
July 1. do. do. . . . do. 40.113.
" 6. do. do. −0″.47. do. 40.109.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	TH
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°
July 6	1	α^2 Libræ	50.4	2.0	13.3	24.5	36.0	47.3	0.0	14 41 24.79	305 43 35.6	33.7	36.5	38.1	35.98*d*	. .		
	2	β Ursæ Minoris	..	..	..	11.0	51.7	34.1	15.8	14 51 13.15	. . . .	..	..	..	. .	. .	29.836	82.
	3	β Libræ	12.9	24.0	34.9	46.0	57.0	8.1	19.2	15 7 46.01	312 18 45.0	42.3	45.2	42.5	43.70	. .	29.836	82.
	4	α Cor. Bor.	34.8	47.2	59.4	11.8	24.0	36.5	39.0	15 27 11.81	348 20 55.2	55.5	54.2	50.8	53.92	. .	29.838	81.
	5	δ Ophiuchi	46.3	57.4	8.1	19.2	30.1	41.3	52.3	16 5 19.24	317 49 40.0	38.8	41.3	35.8	38.98*d*	. .	29.838	81.
	6	α Scorpii	25.2	37.2	49.5	1.9	14.0	26.2	38.2	16 19 1.74	295 3 14.7	12.1	15.6	12.5	13.72	. .	29.850	80.
	7	ε Ursæ Minoris	48.4	12.2	32.8	54.2	15.4	37.5	58.5	17 0 54.14	43 22 43.0	34.3	36.1	35.5	37.22	. .	29.850	79.
	8	Moon, 1st and N. L.	56.7	8.8	20.8	32.8	44.8	56.9	8.8	17 12 32.80	301 3 40.2	39.0	43.0	40.0	40.55	. .	29.850	79.
	9	α Ophiuchi	16.0	27.3	38.5	50.0	1.0	12.2	23.5	17 26 49.79	333 47 37.8	35.1	35.2	33.0	35.28	. .	29.850	78.
	10	μ^1 Sagittarii	1.4	13.2	25.0	36.6	48.3	0.1	12.0	18 3 36.66	300 2 29.4	29.0	32.0	28.2	29.65	. .	29.850	78.
	†11	Venus, 2d and N. L.	16.2	28.0	39.2	51.0	2.4	14.2	26.1	4 16 51.01	340 23 59.5	59.2	57.0	53.8	57.38	. .	29.924	78.
	12	Venus, S. L. (Mic.)	..	..	..	..	..	..	..		" " "	"	"	"	"	39.638		
	13	α Tauri	32.0	43.2	54.4	6.0	17.2	28.8	40.1	4 26 5.96	337 18 23.9	24.0	25.0	20.3	23.30	. .	29.926	78.
	14	α Aurigæ, (Mic.)	32.3	48.2	4.0	19.2	35.2	51.3	7.0	5 4 19.60	6 55 36.0	29.5	31.3	27.8	31.15*d*	41.178		
	15	β Orionis	..	..	57.2	8.2	19.2	30.3	42.0	5 6 19.38	312 44 18.1	18.8	20.2	14.1	17.80	. .		
7	†16	Sun, 1st & S. L. (Mic.2)	55.3	7.4	19.0	31.0	42.8	54.7	7.0	7 3 31.04	343 41 26.2	27.0	26.0	20.3	24.88	40.108	29.940	81.
	†17	Sun, 2d & N. L. (Mic.6)	12.0	24.2	36.0	47.8	59.7	11.7	23.6	7 5 47.86	" " "	"	"	"	"	44.280		
	†18	Mercury	52.3	5.2	..	29.0	..	52.2	4.1	8 23 28.76	342 10 55.1	56.2	52.8	49.7	53.45	. .	29.936	81.
	19	Polaris, S. P.							0.0		52 35 46.8	35.2	41.1	37.0	40.02	. .	29.932	82.
	20							55.0			59.0	47.3	53.0	49.0	52.08	. .		
	21						52.5				66.0	54.2	59.8	55.3	58.82*d*	. .		
	22					44.0				13 3 44.71	68.3	57.1	62.6	57.4	61.35*d*	. .	29.936	82.
	23				40.5						64.4	53.0	58.1	53.5	57.25*d*	. .		
	24			29.0							56.8	45.0	50.1	46.3	49.55	. .		
	25		32.0								42.8	32.0	37.2	32.3	36.08	. .	29.936	81.
	26	η Ursæ Majoris, (Mic.)	37.2	54.1	11.2	28.3	45.2	2.8	19.6	13 40 28.34	11 10 29.5	22.5	26.1	20.2	24.58*d*	41.706	29.938	81.
	27	α Bootis	5.0	18.8	28.2	40.0	51.5	3.1	15.0	14 7 39.94	341 5 56.0	55.1	54.5	51.2	54.20	. .	29.990	81.
	†28	α Scorpii	24.2	37.8	50.0	2.0	14.0	26.2	38.3	16 19 1.79	295 3 14.3	13.6	18.5	12.4	14.70	. .	29.996	77.
	†29	Moon, 1st and S. L. (Mic. 2.)	38.1	50.5	2.2	14.2	26.2	38.0	50.1	18 17 14.19	301 14 59.8	66.7	64.3	59.0	61.20*d*	37.558	29.954	74.9
	†30		..	..	..	..	..	..	..		" " "	"	"	"	"	37.590		
	†31	Moon, N. L. (Mic.6)	..	..	..	..	..	..	..		" " "	"	"	"	"	44.690		
	†32		..	..	..	..	..	..	..		" " "	"	"	"	"	44.702		
	†33		..	..	..	..	..	..	..		" " "	"	"	"	"	44.718		
	†34	α Lyræ	3.0	17.1	30.9	45.0	59.0	13.0	26.8	18 30 44.97	359 45 16.8	14.9	15.3	9.5	14.12	. .		
	†35	δ Aquilæ	14.2	25.0	36.0	47.2	58.0	9.0	19.8	19 16 47.03	323 55 62.5	65.2	61.5	49.8	62.25*d*	. .	29.956	74.0
8	36	Sun, 1st and N. L.	1.5	13.0	25.0	37.5	49.1	1.2	12.5	7 7 37.11	343 51 43.1	43.0	40.0	38.6	41.18	. .	30.022	78.1
	37	Sun, 2d L.	18.3	30.2	42.0	54.0	5.8	17.8	29.6	7 9 53.96	. . . .	..	..	..	. .	. .		
	38	Venus, 2d and N. L.	48.5	1.0	13.5	26.8	38.0	49.2	1.3	4 26 26.90	340 50 38.0	39.4	38.0	36.0	37.85	. .		
9	39	Sun, 1st & S.L. (Mic.2)	7.7	19.5	31.2	43.0	54.8	6.2	19.0	7 11 43.05	343 27 49.9	48.0	47.4	45.1	47.60	40.124	29.996	81.
	†40	Sun, 2d & N.L. (Mic.6)	24.2	36.2	48.0	59.8	11.4	25.2	35.5	7 13 59.76	" " "	"	"	"	"	44.267		
	41	Polaris, S. P.							2.0		52 35 47.3	35.6	42.0	38.5	40.85	. .	29.994	84.0
	42							56.5			59.4	47.8	53.5	50.2	50.22	. .		
	43						56.0				66.1	54.8	60.1	57.2	59.55	. .		
	44					46.0				13 3 47.07	68.2	56.9	63.0	59.5	61.90	. .	29.994	83.
	45				44.0						64.5	53.8	59.0	55.8	58.27	. .		
	46			32.0							56.9	45.1	51.3	48.2	50.38	. .		
	47		33.0								42.3	31.8	38.1	34.2	36.60	. .	29.990	83.
	48	α Bootis	5.2	17.0	28.3	40.0	51.6	3.6	15.2	14 7 40.13	341 5 55.2	54.8	53.3	51.9	53.92	. .	30.000	83.
	49	α Cor. Bor.	35.1	47.9	0.0	12.0	24.6	36.9	49.2	15 27 12.24	348 19 49.1	50.8	49.4	48.5	49.45	. .	29.988	81.
	50	α Serpentis	10.9	21.8	32.8	43.9	54.6	5.9	17.0	15 35 43.84	328 1 49.1	50.2	47.8	48.2	48.82	. .		
	51	γ Aquilæ	26.0	37.2	48.3	59.0	10.5	22.0	33.0	19 37 59.43	331 21 40.0	41.1	38.9	39.3	39.80	. .	30.126	77.
	†52	Moon, 2d & N.L. (Mic.6)	3.0	14.8	26.0	37.8	49.4	1.0	12.8	20 28 37.83	306 23 54.5	55.0	57.1	55.8	55.60	44.122	30.030	77.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	*n.*	*c.*	At 12*h.*	0*s.*
	s.	s.	s.	s.	
July 6	+0.213	+0.298	+0.330	*s* 60.052	*l* .021
7	.213	.298	.330	59.985	*g* .022
9	+0.213	+0.298	+0.330	*s* 59.630	*g* .004

11. Correction for defective illumination of S. L., —0″.27.
16, 17. Perfectly steady and well defined.
18. Observed through clouds, very unsteady.
28. Observed for declination at wire v.
29, 30. Micrometer observations for declination of S. L., taken at 18*m*. 2*s*., and 18*m*
Correction for defective illumination of S. L., —2″.07.
31, 32, 33. Micrometer observations for declination of N. L., taken at 18*m*. 37*s*., 18*m*.
and 19*m*. 2*s*.
34. Added 1*s*. to recorded transit.
35. Unsteady.
40. 2d Limb ragged.
52. Observed for declination at 26*m*. 49*s*., 27*m*. 13*s*., 27*m*. 25*s*., 27*m*. 37*s*., and 27*m*. 49*s*.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.01	— 1 15.84	305 42 20.15	62.30	+ 60.07	+ 0 0.47	14 42 25.33	— 15 24 2.90	+ 10.09	—52.61
. . .	. . .	. . . .	. .	.07	— 0 59.99	14 51 13.23	. . . .	— 1.97	. .
+ 0 0.12	1 0.09	312 17 43.83	. .	.07	+ 0 0.50	15 8 46.58	— 8 48 39.22	+ 9.75	50.17
— 0 0.01	0 11.29	348 20 42.62	. .	.08	0 0.74	15 28 12.63	+ 27 14 19.57	7.56	56.22
0 0.00	0 49.74	317 48 49.24	. .	.09	0 0.53	16 6 19.86	— 3 17 33.81	9.28	40.16
+ 0 0.04	— 1 57.04	295 1 16.72	. .	.09	0 0.43	16 20 2.26	— 26 5 6.38	+ 10.73	31.55
— 0 0.21	+ 0 51.99	43 23 29.00	. .	.11	0 4.87	17 1 59.12	+ 82 17 5.95	— 29.33	34.24
+ 0 0.10	+33 12.18	301 36 52.73	. .	.12	0 0.46	17 14 45.49	— 19 29 30.32	. .	. .
0 0.05	— 0 27.18	333 47 8.15	. .	.12	0 0.62	17 27 50.53	+ 12 40 45.10	+ 7.85	21.60
0 0.08	1 35.01	300 0 54.72	. .	.14	0 0.45	18 4 37.25	— 21 5 28.33	10.37	— 7.17
+ 0 0.02	0 16.87	340 23 32.17	. .	.20	0 0.67	4 17 51.36	+ 19 17 9.12	. .	. .
— 0 16.69	0 17.14								
+ 0 0.04	— 0 22.84	337 18 0.50	. .	.19	0 0.65	4 27 6.80	+ 16 11 37.45	12.33	+34.26
0 36.81	+ 0 6.62	6 56 14.58	. .	.18	+ 0 0.99	5 5 20.77	+ 45 49 51.53	16.08	27.20
+ 0 0.09	— 0 58.93	312 43 18.96	. .	.18	— 0 10.56	5 7 9.00	— 8 23 4.09	10.69	19.55
—14 37.88	0 13.76	343 42 18.43	60.68	.13	+ 0 0.69	7 5 40.27	— 22 35 57.00	. .	. .
+16 52.05	0 13.30								
— 0 0.15	— 0 17.45	342 10 35.85	. .	.10	+ 0 0.70	8 24 29.56	+ 21 4 14.42	. .	. .
+ 0 0.05	+ 1 33.19	52 37 13.26	. .						
0 0.02	1 20.77	13.87	. .						
0 0.00	1 13.34	12.16	. .						
0 0.00	1 11.23	12.58	61.70	.01	— 0 23.55	13 4 21.17	+ 88 29 9.50	38.58	+85.78
0 0.00	1 13.97	11.22	. .						
0 0.02	1 21.44	11.01	. .						
0 0.05	1 34.31	10.44	. .						
+ 0 54.67	+ 0 10.83	11 11 30.10	. .	59.99	+ 0 1.07	13 41 29.40	+ 50 5 7.65	7.97	—79.72
— 0 0.12	— 0 18.87	341 5 35.21	. .	.98	0 0.67	14 8 40.59	+ 19 59 12.76	8.68	75.52
0 0.03	— 1 58.36	295 1 16.31	. .	.93	0 0.43	16 20 2.15	— 26 5 6.14	10.73	31.54
16 5.77	+50 4.57		. .						
—16 4.67	50 3.77		. .						
+17 6.38	49 48.71	302 5 27.87	. .	.89	0 0.47	18 19 27.34	— 19 0 52.76	. .	. .
17 6.41	49 48.09		. .						
+17 5.96	+49 47.62		. .						
— 0 0.03	— 0 0.24	359 45 13.85	. .	.88	0 0.87	18 31 46.72	+ 38 38 51.40	4.88	— 1.24
0 0.15	0 40.78	323 55 21.32	. .	.87	0 0.56	19 17 47.46	+ 2 48 58.87	8.57	+12.50
0 0.09	16 1.09	343 35 40.00	59.88						
. . .	. . .	. . . .	. .		. . .	. . . .	+ 22 29 19.37	. .	. .
0 0.01	0 23.65	340 50 14.99	61.36	.70	0 0.79	4 27 26.88	+ 19 43 52.88	. .	. .
—14 37.80	0 13.91	343 28 40.60	. .	.66	0 0.67	7 13 51.73	+ 22 22 18.49	. .	. .
+16 51.16	— 0 13.45								
— 0 0.05	+ 1 34.14	52 37 15.04	. .						
+ 0 0.03	1 21.31	11.56	. .						
0 0.00	1 13.73	13.28							
0 0.00	1 10.96	12.86	61.68	.64	0 23.55	13 4 23.16	+ 88 29 10.44	36.95	+85.54
0 0.00	1 13.12	11.39	. .						
0 0.03	1 20.32	10.73	. .						
0 0.06	+ 1 32.40	9.06	. .						
0 0.01	— 0 18.68	341 5 34.25	. .	.63	0 0.67	14 8 40.43	+ 19 59 11.82	8.70	—75.70
0 0.18	0 11.39	348 19 38.24	. .	.62	0 0.73	15 28 12.59	+ 27 14 15.81	7.59	56.69
+ 0 0.18	0 34.39	328 1 14.61	. .	.62	0 0.58	15 36 44.04	+ 6 54 52.18	+ 8.86	—49.14
— 0 0.10	— 0 30.49	331 21 9.21	. .	.61	+ 0 0.60	19 38 59.64	+ 10 14 46.78	. .	. .
+16 45.98	+31 5.89		. .						

NADIR POINTS. A.	B.	C.	D.	Means
	July 6	Night.		° ′ 179 59
66″1	65″0	60″2	60″0	62″82
66.0	64.4	60.3	58.0	62.18
66.0	64.8	60.8	58.0	62.40
66.0	64.7	60.2	57.0	61.98
66.0	64.6	60.4	57.5	62.12
66.02	64.70	60.38	58.10	62.30
	July 7	6.5*h.*		179 59
64.4	63.8	58.8	55.8	60.70
64.5	63.5	58.7	56.0	60.68
64.2	63.6	59.2	55.8	60.70
64.4	63.9	58.8	55.7	60.70
63.8	63.7	59.0	55.9	60.62
64.28	63.70	58.90	55.84	60.68
	July 7	14*h.*		179 59
66.0	64.8	60.2	56.2	61.80
65.8	64.8	60.2	56.2	61.75
65.8	64.6	60.0	56.3	61.68
65.7	64.5	60.4	56.4	61.75
65.6	64.0	60.3	56.8	61.55
65.78	64.54	60.22	56.28	61.70
	July 7	19*h.*		179 59
62.8	62.2	58.4	55.9	59.82
63.3	62.7	57.9	56.0	59.98
63.1	62.6	58.0	55.6	59.82
62.8	62.6	58.1	55.8	59.83
63.1	62.5	58.0	56.2	59.95
63.02	62.52	58.08	55.90	59.88
	July 8	5*h.*		179 59
64.6	65.0	59.0	57.6	61.55
64.8	65.2	58.9	57.5	61.60
64.4	64.9	58.8	57.3	61.35
64.2	64.6	58.5	57.3	61.15
64.1	64.7	58.9	57.0	61.18
64.42	64.88	58.82	57.34	61.36
	July 9	14*h.*		179 59
64.9	64.5	59.9	57.8	61.78
64.7	64.4	59.6	57.6	61.57
65.0	64.5	59.5	57.6	61.65
64.7	64.8	59.9	57.6	61.75
64.8	64.5	60.0	57.3	61.65
64.82	64.54	59.78	57.58	61.68
	July 9	20*h.*		179 59
63.8	62.8	58.5	59.0	61.02
63.6	62.9	58.8	59.0	61.08
63.5	62.8	58.4	59.2	60.98
63.6	62.8	58.5	59.2	61.02
63.8	62.9	58.1	59.1	60.98
63.66	62.84	58.46	59.10	61.02

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Moon .	+ 1 12.11	
Venus .	— 0 0.52	0 8.22
Sun .	. . . .	15 45.19
Moon .	+ 1 12.79	
Venus .	— 0 0.51	
Sun .	. . . .	15 45.04

July 6. Error of Runs, +0″40. Mic. coincidence, 40*r*109.
" 7. do. do. 0.41. do. do. } 40.108. 40.110.
" 9. do. do. +0.47. do. do. 40.124.

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THI
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°
July 9	†1	Moon, 2d & N.L. (Mic. 6)	3.0	14.8	26.0	37.8	49.4	1.0	12.8	20 28 37.38	306 23 54.5	55.0	57.1	55.8	55.60	44.190	30.030	77.0
	2		..	..	..	..	..	..	..		" " "	"	"	"	"	44.276		
	3		..	..	..	..	..	..	..		" " "	"	"	"	"	44.280		
	4		..	..	..	..	..	..	..		" " "	"	"	"	"	44.340		
10	5	Sun, 1st and N. L.	13.0	25.0	36.7	48.5	0.2	12.5	24.1	7 15 48.57	343 37 17.4	16.2	15.8	13.5	15.72	. .	30.012	84.8
	6	Sun, 2d L.	29.3	41.4	53.0	5.3	17.1	29.0	41.0	7 18 5.16								
	7	α Cor. Bor.	35.5	48.0	0.0	12.2	24.4	37.0	49.3	15 27 12.34	348 19 53.0	52.9	51.3	51.0	52.05	. .	30.056	86.0
	8	α Serpentis	10.4	22.0	32.8	44.0	54.9	6.1	17.0	15 35 43.89	328 1 53.4	52.2	53.8	53.0	53.10	. .	30.056	85.8
	9	ζ Ursæ Minoris	56.3	51.4	44.5	38.6	32.3	27.0	21.0	15 48 38.73	39 21 52.3	41.2	44.5	44.5	48.12	. .		85.5
	10	β¹ Scorpii	..	..	..	..	44.5	56.0	7.4	15 55 55.97	. . . .	..	..	..	. .	. .		
	11	δ Ophiuchi	46.8	58.0	9.0	20.0	30.7	42.0	53.0	16 5 19.93	317 49 37.8	36.7	40.0	39.0	38.38	. .	30.074	85.0
	12	α Scorpii	25.5	38.0	50.0	2.2	14.5	26.7	38.9	16 19 2.26	295 3 10.7	8.3	9.5	9.4	9.48	. .		85.0
	13	δ Aquilæ	14.8	25.5	36.4	47.3	58.1	9.3	20.2	19 16 47.37	323 55 61.2	62.3	58.5	60.0	60.50	. .	30.078	81.8
	14	β Aquarii	57.0	8.2	19.2	30.1	41.0	52.1	3.1	21 22 30.10	314 52 53.0	53.6	55.6	54.0	54.05	. .	30.064	80.2
	15	Moon, 2d L.	43.0	54.0	5.3	17.0	28.2	40.0	51.2	21 30 16.96	. . . .	..	..	..	. .	. .		
	16	α Tauri	32.2	44.0	55.1	6.3	17.1	29.3	40.8	4 26 6.40	337 18 23.8	24.8	24.2	20.5	22.82	. .	30.112	82.6
	†17	Venus, 2d & N. L.	31.0	42.2	54.2	6.1	17.6	29.2	41.0	4 36 5.90	341 15 23.5	26.0	24.2	21.6	23.82	. .	30.112	83.0
	18	Venus, 2d & S.L. (Mic.4)	..	..	..	..	..	..	..	. . . . .	" " "	"	"	"	"	39.658		
	19	α Aurigæ, (Mic. 4)	..	..	4.6	20.4	36.0	51.9	7.3	5 4 36.04	6 55 30.6	26.2	27.3	27.1	27.80	41.240		
	20	β Orionis	36.0	47.0	58.1	9.2	20.0	31.2	42.2	5 6 9.10	312 44 16.8	18.0	18.8	15.6	17.30	. .	30.118	84.0
11	21	Sun, 1st & S. L. (Mic. 2)	16.8	29.0	40.3	52.7	5.0	17.0	29.0	7 19 52.83	343 12 32.7	35.5	35.9	30.9	33.75	40.119		
	22	Sun, 2d & N. L. (Mic. 5)	34.1	46.3	58.0	10.0	21.8	33.4	45.4	7 22 9.86	" " "	"	"	"	"	44.314	30.108	87.0
	†23	Mercury	18.0	29.2	41.2	53.0	..	16.2	28.0	8 50 50.93	340 9 61.0	61.5	60.2	58.4	60.28	. .	30.093	88.4
	24	Polaris, S. P. (Mic.4)							4.0		52 34 35.4	25.2	30.3	26.5	29.35*d*	. .	30.040	90.0
	25							0.0			" " "	"	"	"	"	. .		
	26						0.0				" " "	"	"	"	"	44.791		
	27					51.0				13 3 50.86	" " "	"	"	"	"	44.843	30.042	90.2
	28				48.0						" " "	"	"	"	"	44.756		
	29			35.0							" " "	"	"	"	"	44.501		
	†30		38.0								" " "	"	"	"	"	44.162	30.044	90.0
	31	β¹ Scorpii	58.0	9.8	21.1	33.0	44.4	56.2	7.8	15 55 32.90	. . . .	..	..	..	. .	. .		
	32	δ Ursæ Minoris, (Mic.4)	44.0								47 40 29.6	20.9	23.2	22.9	24.15*d*	41.968		
	33			52.0							" " "	"	"	"	"	41.778		
	34				53.3					18 19 26.12	" " "	"	"	"	"	41.640	30.016	85.9
	35					59.2					" " "	"	"	"	"	41.640		
	36						0.0				" " "	"	"	"	"	41.660		
	37							8.2			" " "	"	"	"	"	41.760		
	†38	α Lyræ	3.0	17.1	41.0	45.0	59.2	13.0	27.3	18 30 45.09	359 45 15.2	14.0	12.3	11.0	13.12	. .	30.014	85.5
	39	β Lyræ	47.1	0.3	13.2	26.8	39.6	53.0	6.0	18 43 26.57	354 17 57.1	56.6	54.3	55.4	55.85	. .	30.014	85.2
12	†40	Venus, 2d L.	15.4	27.2	38.9	50.5	2.2	14.0	25.8	4 45 50.57	341 38 21.4	22.8	21.0	19.5	21.18	. .	30.042	79.2
13	†41	Sun, 1st and N. L.	26.8	38.7	50.6	2.4	13.9	25.5	37.6	7 28 2.21	343 12 44.1	45.4	44.4	48.0	45.48	. .	30.042	82.5
	†42	Sun, 2d L.	42.8	54.8	6.5	18.3	30.1	42.0	53.9	7 30 18.34	. . . .	..	..	..	. .	. .	30.042	82.5
	43	α Bootis	5.6	17.6	28.9	40.7	52.1	4.0	15.6	14 7 40.64	341 5 54.2	54.7	53.0	53.0	53.72	. .	29.970	84.0
	44	α² Libræ	..	..	..	25.5	36.9	48.2	59.5	14 41 42.52	305 43 36.5	36.1	40.5	41.0	38.52	. .		79.0
	45	β Ursæ Minoris	..	48.6	29.9	11.8	53.0	35.1	16.5	14 50 32.28	35 52 68.0	67.2	62.0	59.8	64.25	. .	29.976	83.8
	46	β Libræ	13.6	24.8	35.7	47.0	58.0	9.1	20.1	15 7 46.90	312 18 42.5	41.0	43.6	42.5	42.40	. .	29.974	83.1
	47	α Serpentis	11.1	22.2	33.1	44.1	55.0	6.2	17.2	15 35 44.13	328 1 50.0	51.3	54.0	52.8	52.02	. .		77.3
	48	β¹ Scorpii	58.4	10.2	21.9	33.0	44.9	56.6	8.1	15 55 33.30	301 45 2.8	2.8	5.8	6.8	4.55	. .	39.982	82.0
	49	δ Ophiuchi	47.5	58.5	9.4	20.4	31.1	42.1	53.1	16 5 20.30	317 49 35.5	37.0	39.0	40.5	38.00	. .		
	†50	α Scorpii	25.9	38.3	50.3	2.5	15.5	27.0	39.5	16 19 2.71	295 3 14.0	13.0	16.5	17.0	15.12	. .		81.2
	†51	ε Ursæ Minoris	50.0	13.0	32.6	55.5	..	..	..	16 58 52.27	43 22 39.8	31.9	34.6	35.5	35.45*d*	. .	29.968	80.8
14	52	Polaris, S. P. (Mic. 4)							7.5		52 34 33.0	23.8	28.6	26.0	27.85*d*	42.139	29.994	81.2

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	*n.*	*c.*	At 17*h.*	0*s.*
	s.	s.	s.	s.	
July 10	+0.213	+0.298	+0.330	*s* 59.557	*g* .000
11	0.213	0.298	0.330	59.647	.005
13	+0.213	+0.298	+0.330	*s* 59.143	*g* .011

1. Observed for declination at 26*m.* 49*s.*, 27*m.* 13*s.*, 27*m.* 25*s.*, 27*m.* 37*s.*, 27*m.* 49*s.*
17. Correction for defective illumination of N. L. +0″.09.
23 to 30. Observed through a haze.
38. Added 1*s.* to recorded transit.
38, 40, 41, 42. Very unsteady.
50. Blurred and very unsteady.
51. At wire IV, nearly obscured.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+16 48.22	+31 3.32		. .						
16 51.28	31 2.02	307 11 46.58	61.68	+ 59.60	+ 0 0.49	20 28 26.00	— 13 54 35.85	. .	. .
16 51.42	30 57.22								
16 53.42	+30 55.99		. .						
+ 0 0.15	—16 1.91	343 21 13.96	. .	.56	0 0.70	7 17 57.12	+ 22 14 51.53	. .	. .
— 0 0.14	0 11.29	348 19 40.52	. .	.56	0 0.74	15 28 12.64	+ 27 14 18.09	+ 7.60	—56.84
— 0 0.14	— 0 34.16	328 1 18.80	. .	.56	0 0.58	15 36 44.03	+ 6 54 56.37	+ 8.87	49.25
+ 0 0.10	+ 0 44.87	39 22 33.09	. .	.56	+ 0 3.27	15 49 41.56	+ 78 16 10.66	— 10.54	57.81
. . .	. . .	. . . .	. .	.56	— 0 22.73	15 56 32.80	. . . . .	+ 10.31	
— 0 0.16	— 0 49.61	317 49 48.61	61.22	.56	+ 0 0.53	16 6 20.02	— 3 17 33.36	9.29	40.50
+ 0 0.02	1 56.38	295 1 13.12	. .	.56	0 0.43	16 20 2.25	— 26 5 8.85	10.75	—31.49
— 0 0.12	0 40.10	323 55 20.28	. .	.56	0 0.56	19 17 47.49	+ 2 48 58.31	8.54	+12.02
— 0 0.13	0 55.47	314 51 58.45	. .	.56	0 0.51	21 23 30.17	— 6 14 23.52	9.28	42.03
. . .	. . .	. . . .	. .	.56	0 0.50	21 30 6.96	. . . .	. .	. .
+ 0 0.04	0 22.64	337 18 0.22	61.04	.71	0 0.65	4 27 6.76	+ 16 11 38.43	12.23	33.91
+ 0 0.04	0 16.08	341 14 59.92	. .	.71	+ 0 0.68	4 37 5.78	+ 20 8 38.13	. .	. .
— 0 15.68	— 0 16.09								
+ 0 38.72	+ 0 6.58	6 56 13.10	. .	.71	— 0 14.71	5 5 21.04	+ 45 49 51.13	51.97	27.58
+ 0 0.08	— 0 58.41	312 43 18.97	. .	.71	+ 0 0.50	5 7 9.31	— 8 23 2.82	10.61	18.79
—14 37.94	0 13.00	342 13 27.58	. .	.70	0 0.70	7 22 1.74	+ 22 7 5.79	. .	. .
+16 53.17	0 13.57								
— 0 0.11	— 0 16.82	340 9 43.35	. .	.69	+ 0 2.60	8 51 53.22	+ 19 3 21.56	. .	. .
. . .	. . .	. . . .	60.87						
. . .	. . .	. . . .	. .						
+ 1 31.80	+ 1 12.34	52 37 11.49	. .						
1 33.59	1 10.18	13.12	. .	.67	— 0 23.55	13 4 26.98	+ 88 29 8.77	35.48	+85.34
1 30.59	1 12.99	12.93	. .						
1 21.82	1 20.53	11.70	. .						
1 10.15	1 33.50	13.00	. .						
. . .	. . .	. . . .	. .	.65	+ 0 0.44	15 56 32.99	. . . . .	+ 10.32	. .
1 3.48	0 49.73	47 42 17.36	. .						
0 56.94	0 55.43	16.52	. .						
0 52.20	0 58.76	15.11	. .	.64	+ 1 42.78	18 22 8.54	+ 86 35 54.68	— 85.96	— 6.50
0 52.20	1 0.02	16.37	. .						
0 52.88	0 59.08	16.11	. .						
0 56.32	+ 0 55.87	16.34	. .						
+ 0 0.01	— 0 0.24	359 45 12.89	. .	.64	0 0.87	18 31 46.60	+ 38 38 51.40	+ 4.88	— 2.30
0 0.00	0 5.45	354 17 50.40	. .	.64	0 0.80	18 44 27.01	+ 33 11 28.78	5.56	+ 0.98
— 0 0.25	0 24.59	341 37 56.34	60.86	.28	0 0.68	4 46 50.03	+ 20 31 34.73	. .	. .
— 0 0.27	16 2.19	342 46 43.02	. .	.24	0 0.69	7 30 10.21	+ 21 50 21.41	. .	. .
. . .	. . .	. . . .	. .						
+ 0 0.04	0 18.71	341 5 35.05	61.31	.18	+ 0 0.67	14 8 40.49	+ 19 59 13.00	8.74	—76.01
— 0 0.61	— 1 16.31	305 42 21.60	. .	.17	— 0 16.55	14 42 25.14	— 15 24 0.46	+ 10.16	52.90
+ 0 0.36	+ 0 39.77	35 53 44.38	. .	.17	— 0 18.71	14 51 12.74	+ 74 47 22.32	— 1.46	72.35
— 0 0.26	— 1 0.58	312 17 41.56	. .	.16	+ 0 0.50	15 8 46.56	— 8 48 40.50	+ 9.81	50.57
+ 0 0.42	0 34.14	328 1 18.30	. .	.16	0 0.58	15 36 43.87	+ 6 54 56.24	8.90	49.57
— 0 0.03	1 28.97	301 43 35.55	. .	.15	0 0.44	15 56 32.89	— 19 22 46.51	10.33	38.22
+ 0 0.60	0 49.99	317 48 48.61	. .	.15	0 0.53	16 6 19.98	— 3 17 33.45	9.31	40.74
0 0.10	— 1 57.54	295 1 17.48	. .	.14	0 0.43	16 20 2.28	— 26 5 4.68	+ 10.77	31.45
. . .	+ 0 52.23	43 23 27.68	. .	+ 59.14	+ 2 7.10	17 1 58.51	+ 82 17 5.62	— 28.58	—37.81
+ 1 9.36	+ 1 33.37	52 37 10.38	59.64						

NADIR POINTS.				
A.	B.	C.	D.	Means
	July	10,	Night.	° ′ 179 59
64″0	65″5	58″0	58″8	61″08
64.1	63.5	58.0	58.8	61.10
65.0	63.4	58.0	58.5	61.22
64.6	63.6	58.9	58.8	61.48
64.43	63.50	58.23	58.72	61.22
	July	11,	Day.	179 59
62.8	64.2	60.8	56.3	61.02
62.8	64.3	60.6	56.1	60.95
63.0	64.3	60.6	56.3	61.05
63.3	64.3	60.5	56.4	61.13
63.2	64.3	60.5	56.2	61.05
63.02	64.28	60.60	56.26	61.04
	July	11,	Night.	179 59
63.2	63.2	58.5	58.5	60.85
63.2	63.2	58.7	58.5	60.90
63.9	63.0	59.9	58.2	60.75
63.0	63.3	58.9	58.5	60.92
62.9	63.5	58.8	58.5	60.93
63.04	63.24	58.76	58.44	60.87
	July	13,	Day.	179 59
64.2	64.6	58.0	58.9	61.42
63.8	64.9	59.7	59.0	61.85
62.2	63.0	59.2	58.8	60.80
62.0	62.5	57.5	58.1	60.02
62.1	62.7	58.0	58.0	60.20
62.86	62.54	58.48	58.56	60.86
	July	13,	Night.	179 59
58.0	58.2	62.2	61.9	60.08
58.8	60.5	63.3	63.5	61.52
59.5	60.6	63.3	63.0	61.60
59.0	60.3	64.0	63.3	61.65
59.0	60.3	63.8	63.6	61.68
58.86	59.98	63.32	63.06	61.31

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Moon .	— 1 11.47	
Moon .	1 10.06	
Venus .	0 0.51	0 7.87
Sun . .	. . . .	15 44.77
Venus .	— 0 0.50	

July 10. Error of Runs, —0″36.
" 11. do. do. +0.12.
" 13. do. do. +1.11.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	TI
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		A
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	
July 14	1							59.0			52 34 33.0	23.8	28.6	26.0	27.85	42.452		
	2						59.0				“ “ “	“	“	“	“	42.660		
	†3	Polaris, S. P. (Mic.4)								13 3 51.83	“ “ “	“	“	“	“	42.710	30.000	81
	4				48.0						“ “ “	“	“	“	“	42.638		
	5			38.0							“ “ “	“	“	“	“	42.398		
	6		39.5								“ “ “	“	“	“	“	42.095	30.006	80
	7	β^1 Scorpii	58.8	10.0	22.0	33.8	45.0	56.8	8.2	15 55 33.51	301 44 59.1	61.5	62.4	62.5	61.38	. .	30.024	76
	8	δ Aquilæ, (Mic. 4)	15.2	26.2	37.1	48.0	59.1	10.0	21.2	19 16 48.11	333 54 0.0	3.5	1.7	0.3	1.38	43.660	30.058	72
15	9	Anonymous	33.5	44.5	55.8	7.0	18.4	29.5	40.8	14 42 7.07	307 27 40.5	42.9	44.4	46.5	43.58	. .	30.260	71
	10	ε Ursæ Minoris	50.3	13.5	34.0	55.6	16.6	39.0	1.0	17 0 55.71	. . . .	..	..	..	. .	. .		
	11	α Herculis	..	..	30.5	40.7	53.0	4.5	15.7	17 6 52.88	. . . .	..	..	..	. .	. .		
	12	α Ophiuchi	17.8	29.0	40.0	51.1	2.5	14.0	25.1	17 26 51.36	333 47 40.5	40.8	39.0	41.0	40.33	. .	30.230	68
	†13	Venus, 2d and N. L.	0.7	12.8	24.2	36.0	48.0	59.3	11.2	5 0 36.03	342 9 2.3	5.0	2.5	0.8	2.65	. .	30.308	67
	14	Venus, S. L. (Mic.4)	..	..	..	..	..	..	..		“ “ “	“	“	“	“	39.760		
16	15	η Draconis	46.2	10.2	34.0	56.3	20.1	43.0	6.2	16 20 56.57	22 57 55.5	60.0	60.8	59.0	58.82	. .	30.294	70
	16	ε Ursæ Minoris	..	13.4	35.0	56.8	17.3	39.3	..	17 0 56.36	43 22 36.8	29.1	31.7	32.6	32.55*d*	. .	30.298	69
	17	α Ophiuchi	17.2	28.2	40.2	41.1	2.8	14.0	25.0	17 26 51.21	333 47 38.5	40.4	38.3	38.6	38.95	. .	30.294	67
	18	μ^1 Sagittarii	..	15.0	26.2	38.3	50.2	2.0	13.3	18 3 44.17	300 2 33.5	34.5	36.0	34.6	34.65	. .	30.298	66
	19			53.0							. . . .	..	..	..	. .	. .		
	20				56.0						47 41 22.1	12.5	15.8	15.9	16.57	. .		
	21	δ Ursæ Minoris				2.0				18 21 0.50	20.3	11.4	15.2	14.8	15.42	. .	30.298	66
	22						2.0				22.0	12.8	16.5	16.2	16.87	. .		
	23							9.5			. . . .	..	..	..	. .	. .		
	24	α Lyræ	5.4	19.4	33.6	47.4	1.6	15.2	29.7	18 30 47.48	359 45 17.6	17.4	17.4	14.3	16.68	. .		
	25	β Lyræ	48.2	1.8	15.0	28.0	41.0	54.2	7.1	18 43 27.90	354 17 59.0	59.3	57.0	57.0	58.08	. .	30.298	65.
	26	ζ Aquilæ	50.8	2.1	13.1	24.5	35.6	47.0	58.2	18 57 24.47	334 45 27.0	31.1	27.9	27.8	28.45	. .	30.296	64.
	27	γ Aquilæ	27.7	38.8	49.4	1.0	11.8	23.0	34.1	19 38 0.83	331 21 41.0	44.1	41.5	42.1	42.18	. .	30.298	64.
	28	α^2 Capricorni	1.8	13.0	24.0	35.2	46.2	58.0	9.0	20 8 35.31	308 6 48.1	52.6	54.5	54.5	52.42	. .	30.290	63.
	29	Saturn, 2d & N. L.	16.0	..	38.8	..	1.8	..	21.2	22 9 50.42	308 9 12.2	14.6	19.0	14.9	15.18	. .	30.288	62.
	30	Saturn, 2d & S. L. (Mic.4)	..	29.0	..	51.2	..	14.0	..		“ “ “	“	“	“	“	39.531	“	“
19	31	α Coronæ Bor.	35.5	47.9	0.0	12.3	24.4	39.9	49.2	15 27 12.31	348 20 56.0	57.9	55.0	52.0	55.22	. .	29.970	69.
	32	α Serpentis	10.6	21.8	32.7	44.0	54.8	6.0	17.0	15 35 43.84	328 1 52.2	53.0	55.1	50.0	52.58	. .		69.
	33	ζ Ursæ Minoris	56.8	51.5	44.5	38.7	32.4	26.0	20.4	15 48 38.61	. . . .	..	..	..	. .	. .		
	34	β^1 Scorpii	58.0	9.9	21.1	33.0	44.2	56.0	7.5	15 55 32.81	301 45 4.0	3.2	5.3	4.8	4.32	. .		69.
	35	δ Ophiuchi	47.0	58.0	9.0	19.9	30.8	41.7	52.7	16 5 19.87	317 49 40.4	41.3	41.0	40.6	40.82	. .	29.982	69.
20	36	ε Ursæ Minoris	49.0	11.2	31.0	53.0	15.5	37.0	58.0	17 0 53.53	43 22 41.7	34.6	37.9	37.0	37.80*d*	. .	30.046	72.
	37	β Draconis	4.4	23.0	40.2	58.2	16.3	34.2	52.2	17 25 58.36	13 31 29.0	23.9	26.2	22.8	25.48*d*	. .	30.044	71.
23	38	α Aurigæ	29.0	45.0	0.3	16.2	32.1	48.0	3.6	5 4 16.31	6 56 10.7	6.2	8.0	6.3	7.80	. .	29.834	77.
24	39	Sun, 1st & S. L. (Mic.2)	..	..	..	..	16.0	28.2	40.0	8 13 28.07	340 57 56.0	59.2	57.6	54.2	56.75	40.128	29.850	81.
	†40	Sun, 2d & N. L. (Mic.6)	44.0	..	7.4	19.0	31.0	42.6	54.0	8 15 23.00	“ “ “	“	“	“	“	44.324	29.850	82.
	41	Mercury, 1st & N. L.	7.2	19.0	29.8	41.0	52.1	3.2	14.2	10 0 40.93	332 47 49.7	51.3	51.1	46.9	49.75	. .	29.844	83.
	42	12 Canum Venat. (Mic.4)	58.6	12.8	26.3	41.0	55.0	9.3	23.2	12 48 40.89	0 15 9.3	8.5	6.0	5.5	7.32	40.738		
	43								2.0		52 35 45.4	36.3	42.3	39.0	40.75	. .	29.814	85.
	44							59.0			58.3	48.8	54.1	51.0	53.05	. .		
	†45	Polaris, S. P.					55.0				64.8	55.5	61.1	57.3	59.68	. .	29.810	85.
	46				56.0					13 4 50.42	64.4	55.0	60.6	57.1	59.28	. .		
	47			34.5							58.0	48.3	53.4	50.8	52.62	. .		
	48		36.0								44.0	34.4	40.2	37.3	38.97	. .		
	49	α Virginis, (Mic. 4)	5.2	36.4	47.3	58.3	10.0	21.0	32.0	13 16 58.60	310 44 56.9	56.8	60.3	56.0	57.50	41.742	29.808	85.
	50	α Aquilæ, (Mic. 4)	37.2	48.2	59.5	10.5	21.6	33.0	43.9	19 43 10.56	329 34 30.7	33.4	33.6	30.9	32.15*d*	41.250	29.894	80.
	51	β Aquilæ	6.2	17.2	28.3	39.2	50.3	1.5	12.4	19 47 39.30	327 8 48.9	53.7	52.5	51.2	51.58	. .	29.894	79.
	52	α Cygni	19.0	34.1	50.0	5.0	20.1	36.0	51.4	20 36 5.09	5 50 32.1	28.2	29.2	29.5	29.75	. .	29.904	79.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 17*h*.	0*s*.
	s.	s.	s.	s.	
July 14	+0.213	+0.298	+0.330	*s* 58.886	*g* .011
15	.213	.298	.330	58.483	.010
16	.213	.298	.330	58.354	*l* .006
19	.213	.298	.330	59.586	.017
24	+0.079	+0.300	+0.230	*s* 8.856	*l* .003

3. Micrometer observation near wire IV taken at 4*m*., 0*s*.
13. Correction for defective illumination of S. L., —0″.06.
40. Observed through clouds.
45. At wire IV obscured by a cloud.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THE
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°
July 24	1	γ Cephei	36.5	24.8	13.0	1.0	48.0	36.5	24.2	23 33 0.57	37 51 68.2	59.6	61.2	60.9	62.48	. .	29.929	74.5
	2	α Andromedæ	43.0	55.2	7.5	20.2	32.4	45.0	57.2	0 0 20.07	349 21 8.9	10.9	9.0	7.2	9.00	. .	29.930	75.0
	3	Polaris, (Mic. 4)	20.5								49 34 36.1	28.0	32.1	30.4	31.66*d*	40.598	29.942	75.0
	4	„		24.0							“ “ “	“	“	“	“	40.240		
	5	„			15.5						“ “ “	“	“	“	“	40.033		
	6	„				9.0				1 4 9.43	“ “ “	“	“	“	“	39.960	29.952	75.0
	7	„					2.0				“ “ “	“	“	“	“	40.010		
	8	„						59.0			“ “ “	“	“	“	“	40.222		
	9	„							56.0		“ “ “	“	“	“	“	40.561	29.956	74.7
25	10	Sun, 1st and N. L.	26.8	38.7	50.0	2.0	13.6	25.1	37.0	8 17 1.89	341 2 7.6	10.0	7.1	4.3	7.25	. .	30.070	80.0
	11	Sun, 2d L.	41.1	53.0	4.7	16.1	28.0	39.4	51.2	8 19 16.21	. . . .	..	..	..	. .	. .		
26	†12	β Corvi	35.8	47.9	59.5	11.5	23.2	35.0	47.0	12 26 11.41	. . . .	..	..	..	. .	. .	30.120	
	13	ε Bootis	31.2	43.5	56.0	8.6	20.8	33.1	45.5	14 38 8.38	. . . .	..	..	..	. .	. .		
	14	α² Libræ	41.5	53.4	4.5	16.0	27.3	..	50.1	14 42 12.13	305 43 36.5	35.2	38.0	36.7	36.60	. .	30.111	81.5
	15	β Ursæ Minoris	..	..	..	..	..	..	..		35 52 68.0	67.0	60.0	59.2	63.55	. .		81.5
	16	β Libræ	4.3	15.5	26.5	37.4	48.3	59.6	10.8	15 8 37.48	312 18 43.0	43.1	42.4	40.0	42.12	. .	30.140	81.4
	17	α Serpentis	..	..	..	34.5	46.0	56.8	8.0	15 36 51.32	. . . .	..	..	..	. .	. .		
	18	ζ Ursæ Minoris	46.7	41.5	34.8	29.0	22.7	16.6	10.5	15 49 28.83	39 21 56.2	48.3	51.0	51.0	51.62	. .		80.5
	19	β¹ Scorpii	..	..	..	23.8	35.5	46.8	58.5	15 56 35.38	. . . .	..	..	..	. .	. .		
	†20	δ Ophiuchi	38.0	49.0	0.0	10.9	21.8	32.8	43.8	16 6 10.90	317 49 37.1	39.1	41.3	41.0	39.62	. .		80.3
	21	α Scorpii	16.8	28.9	40.5	52.2	4.2	16.2	28.7	16 19 52.50	. . . .	..	..	..	. .	. .		
	22	δ Aquilæ	5.6	16.5	27.6	38.5	49.5	0.5	10.7	19 17 38.41	323 56 6.0	9.0	6.6	5.2	6.70	. .	30.114	77.8
	23	γ Aquilæ	..	28.5	40.0	50.8	1.7	13.0	24.0	19 38 56.32	331 21 43.0	46.0	42.5	44.0	43.88	. .	30.114	77.0
	24	β Aquilæ	6.5	17.5	28.4	39.3	50.1	1.5	12.5	19 47 39.40	327 8 50.6	54.0	53.6	52.8	52.75	. .	30.116	77.0
	25	α² Capricorni	51.5	2.8	14.1	25.0	36.3	47.3	58.7	20 9 25.10	308 6 46.0	47.8	51.0	52.0	49.20*d*	. .		77.0
	26	α Cygni	24.5	38.0	51.3	5.0	18.2	31.5	45.0	20 36 4.79	. . . .	..	..	..	. .	. .	30.111	76.8
	27	61¹ Cygni	13.0	27.0	41.0	54.5	8.5	22.2	36.3	20 59 54.64	359 6 26.0	26.0	25.0	23.0	25.00	. .	30.002	72.2
	28	β Aquarii	48.3	59.2	10.4	21.3	32.6	43.7	54.6	21 23 21.44	314 52 56.2	56.6	56.0	56.0	56.20	. .	30.000	76.0
29	29	ε Ursæ Minoris	39.2	1.0	22.1	44.4	6.5	27.5	49.5	17 1 44.31	43 22 40.8	33.9	37.8	36.6	37.28*d*	. .	29.960	78.0
	30	α Herculis	56.8	8.3	19.6	31.0	42.0	53.7	4.6	17 7 30.86	335 41 8.6	13.0	10.8	9.3	10.42	. .	29.960	77.7
	31	α Ophiuchi	7.0	18.4	29.3	40.5	52.0	3.2	14.4	17 27 40.69	333 47 36.5	39.2	37.8	35.8	37.32	. .	29.958	76.9
	32	61¹ Cygni	12.0	26.4	27.8	40.0	53.8	8.0	9.2	20 59 53.93	359 6 25.4	26.7	26.8	23.5	25.60	. .	29.940	74.3
	33	61² Cygni, (Mic. 4)	13.6	27.8	41.5	55.2	9.2	23.2	37.0	20 59 55.33	“ “ “	“	“	“	“	40.042	“	“
	†34	α Cephei	38.0	1.7	24.7	48.2	11.4	34.8	58.0	21 14 48.11	23 2 21.2	13.4	16.1	16.3	16.75	. .	29.940	74.0
	35	ε Pegasi	58.0	9.2	20.0	31.3	42.2	53.6	4.3	21 36 31.23	330 17 31.4	35.5	33.5	31.3	32.92	. .	29.938	74.2
	36	α Aquarii	13.2	24.5	35.2	46.2	57.0	8.1	19.0	21 57 46.17	320 3 31.9	38.0	37.6	35.1	35.65	. .	29.928	73.9
	37	Saturn, 1st and N. L.	7.8	..	30.4	..	53.0	..	15.5	22 6 42.19	307 50 39.1	41.9	43.2	43.8	42.00	. .	29.928	73.8
	38	Saturn, 2d & S. L. (Mic. 4)	..	20.2	..	42.7	..	5.2	..		“ “ “	“	“	“	“	39.549	“	“
	39	α Piscis Aust.	23.2	36.2	48.8	1.4	13.0	27.0	39.7	22 49 1.33	290 43 0.1	1.3	5.0	1.1	1.88	. .	29.922	73.5
	†40	γ Cephei	36.2	25.0	12.5	0.8	48.0	36.5	24.0	23 33 0.43	37 51 67.2	59.8	61.1	61.2	62.32	. .	29.918	73.0
	41	α Andromedæ	42.3	55.0	7.1	20.0	32.1	45.0	57.0	0 0 19.79	349 21 7.3	10.3	8.8	6.8	8.30	. .	29.920	73.0
	†42	Venus, 2d and N. L.	20.1	32.2	44.0	56.0	7.6	19.8	31.7	6 11 55.91	343 27 16.0	16.0	14.5	12.7	14.80	. .	29.950	76.0
30	†43	Sun, 1st and N. L.	4.9	16.6	28.2	39.7	51.5	3.0	14.6	8 36 39.78	339 53 10.0	11.5	9.5	9.0	10.00	. .	29.934	81.0
	†44	Sun, 2d L.	19.5	31.1	42.5	54.2	5.9	17.5	29.0	8 38 54.24	. . . .	..	..	..	. .	. .		
	†45	Venus, 2d and N. L.	26.4	38.5	50.2	2.2	14.1	26.0	38.0	6 17 2.20	343 28 28.8	27.5	28.4	26.3	27.75	. .	29.970	81.5
31	46	ε Ursæ Minoris	38.4	0.4	21.4	43.6	4.5	26.3	48.2	17 1 43.26	43 22 48.2	40.3	42.2	44.0	43.68	. .	29.956	83.0
	47	α Ophiuchi	6.2	17.5	28.7	40.0	51.1	2.5	13.7	17 27 39.96	333 47 42.8	41.8	42.0	43.0	42.40	. .	29.964	83.0
	48	α Lyræ	54.0	8.1	21.9	36.0	50.0	4.0	18.1	18 31 36.01	359 45 21.5	19.8	19.0	13.5	19.70	. .	29.960	81.3
	49	β Lyræ	37.1	50.2	3.2	16.4	29.5	42.5	55.6	18 44 16.36	354 18 62.0	61.4	59.0	59.0	60.35	. .	29.960	80.8
	†50	ζ Aquilæ	39.5	51.6	..	..	24.4	35.5	46.8	18 58 15.52	. . . .	..	..	..	. .	. .		
	†51	β Aquilæ	..	..	..	38.0	49.3	0.0	11.2	19 47 54.62	327 8 48.5	51.1	50.3	50.5	50.10	. .	29.976	80.0
	52	α² Capricorni	50.4	1.6	12.7	24.0	35.1	46.5	57.7	20 9 24.00	308 6 43.5	46.0	48.3	48.0	46.45	. .	29.975	79.8

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 17*h*.	0*s*.
	s.	s.	s.	s.	
July 26	+0.213	+0.298	+0.330	*s* 8.545	*l* .003
29	.117	.200	.330	9.228	.009
31	+0.117	+0.200	+0.330	*s* 9.775	*l* .001

12. Very faint.
20. Observed for declination at first supplemental wire.
34. Perfectly defined and steady.
40. Unsteady at first.
42, 43, 44, 45. Very unsteady.
50. Observed through a cloud. At wires III and IV entirely obscured.
51. Observed through a cloud.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
− 0 0.21	+ 0 43.35	37 52 45.62	60.88	+ 8.87	+ 0 2.36	23 33 11.80	+ 76 46 23.99	+ 1.97	+78.54
− 0 0.03	− 0 10.48	349 20 58.49	. .	.88	0 0.50	0 0 29.45	+ 28 14 36.86	8.92	68.67
+ 0 16.31	+ 0 42.32	30.29	. .						
+ 0 3.99	0 55.22	49 34 30.87	. .						
− 0 3.13	1 2.81	31.34	. .						
0 5.64	1 5.54	31.56	. .	.88	0 20.13	1 4 38.44	+ 88 29 10.32	24.53	+83.76
− 0 3.92	1 3.35	31.09	. .						
+ 0 3.37	0 56.02	31.05	. .						
0 15.03	+ 0 43.88	30.57	. .						
+ 0 0.11	−16 3.15	340 46 4.21	. .	. .	. . .	. . . .	+ 19 39 42.58	. .	. .
. . .	. . .	. . . .	. .	.53	0 0.45	12 26 20.39	. . . .	10.47	−62.56
. . .	. . .	. . . .	. .	.54	0 0.74	14 38 17.66	. . . .	8.45	. .
0 0.00	− 1 15.77	305 42 20.83	61.29	.54	0 4.26	14 42 24.93	− 15 24 1.21	10.32	53.51
0 0.00	+ 0 39.82	35 53 42.08	. .	. .	. . .	. . . .	+ 74 47 21.33	. .	73.03
− 0 0.02	− 1 0.52	312 17 41.60	. .	.54	+ 0 0.50	15 8 46.52	− 8 48 40.46	9.95	51.30
. . .	. . .	. . . .	. .	.54	− 0 15.95	15 36 43.91	. . . .	+ 9.03	. .
− 0 0.03	+ 0 45.37	39 22 36.96	. .	.54	+ 0 3.27	15 49 40.64	+ 78 16 14.92	− 9.00	60.01
. . .	. . .	. . . .	. .	.54	− 0 11.14	15 56 32.78	. . . .	+ 10.45	. .
+ 0 0.01	− 0 50.36	317 48 49.27	. .	.54	+ 0 0.53	16 6 19.97	− 3 17 32.77	9.43	−41.70
. . .	. . .	. . . .	. .	.54	0 0.43	16 20 1.47	. . . .	10.88	. .
0 0.00	0 40.62	323 56 26.08	. .	.55	+ 0 0.56	19 17 47.52	+ 2 49 4.04	8.44	+ 9.65
− 0 0.02	0 30.50	331 21 13.88	. .	.55	− 0 5.07	19 38 59.80	+ 10 14 51.34	7.82	14.95
0 0.00	0 36.04	327 8 16.71	. .	.55	+ 0 0.58	19 47 48.53	+ 6 1 54.67	8.15	15.89
0 0.00	1 11.10	308 5 38.10	. .	.55	0 0.48	20 9 34.13	− 13 0 43.94	9.45	23.41
. . .	. . .	. . . .	. .	.56	0 0.99	20 36 14.34	. . . .	4.39	. .
− 0 0.01	0 0.83	359 6 24.16	. .	.56	0 0.86	21 0 4.06	+ 38 0 2.12	6.75	50.44
+ 0 0.04	− 0 55.93	314 52 0 31	. .	.56	0 0.51	21 23 30.51	− 6 14 21.73	+ 8.99	+39.98
− 0 0.03	+ 0 52.59	43 23 29.84	59.69	+ 9.23	0 3.43	17 1 56.97	+ 82 17 9.40	− 26.50	−39.39
+ 0 0.24	− 0 25.19	335 40 45.47	. .	.23	0 0.51	17 7 40.60	+ 14 34 25.03	+ 7.88	30.50
+ 0 0.09	0 27.46	333 47 9.95	. .	.23	0 0.50	17 27 50.42	+ 12 40 49.47	7.95	−25.22
− 0 0.11	0 0.87	359 6 24.63	. .	.26	0 0.68	21 0 3.87	+ 38 0 4.19	6.72	+49.47
− 0 3.09	− 0 0.87	359 6 21.64	. .	.26	0 0.68	21 0 5.27	+ 38 0 1.20	6.72	49.47
+ 0 0.19	+ 0 23.73	23 2 40.67	. .	.27	0 1.20	21 14 58.58	+ 61 56 19.92	1.15	45.26
+ 0 0.12	− 0 31.86	330 17 1.18	. .	.27	0 0.49	21 36 40.99	+ 9 10 40.74	8.16	43.93
− 0 0.16	0 46.76	320 2 48.73	. .	.27	0 0.44	21 57 55.88	− 1 3 31.71	8.72	46.50
+ 0 0.09	1 11.04	307 49 21.09	. .	.27	0 0.41	22 6 51.87	− 13 17 7.25	. .	. .
− 0 19.81	1 11.05								
+ 0 0.27	− 2 26.54	290 40 35.61	. .	.29	0 0.38	22 49 11.00	− 30 25 44.83	9.81	48.12
− 0 0.28	+ 0 43.49	37 52 45.53	60.04	.29	0 2.31	23 33 12.03	+ 76 46 24.74	1.62	77.04
0 0.04	− 0 10.52	349 20 57.74	. .	.29	0 0.60	0 0 29.68	+ 28 14 36.95	+ 8.78	+67.44
− 0 0.04	0 21.40	343 27 53.36	. .	. .	0 0.56	. . . .	+ 22 20 32.27	. .	. .
+ 0 0.13	16 3.81	339 37 6.17	. .	. .	0 0.53	. . . .	+ 18 30 45.38	. .	. .
. . .	. . .	. . . .	. .	. .	. . .				
0 0.23	− 0 14.27	343 28 13.71	. .	.76	0 0.56	6 17 12.07	+ 22 21 52.92	. .	. .
0 0.22	+ 0 51.85	43 23 35.75	. .	.77	0 3.43	17 1 56.46	+ 82 17 14.96	− 26.21	−39.74
+ 0 0.05	− 0 27.07	333 47 15.38	61.43	.77	0 0.50	17 27 50.23	+ 12 40 53.20	+ 7.97	25.48
− 0 0.06	0 0.23	359 45 19.41	. .	.78	0 0.69	18 31 46.48	+ 38 38 57.23	4.97	7.76
− 0 0.18	0 5.51	354 17 54.66	. .	.78	+ 0 0.64	18 44 26.78	+ 33 11 32.48	5.60	− 4.28
. . .	. . .	. . . .	. .	.78	− 0 1.74	18 58 23.56	. . . .	7.54	. .
+ 0 0.03	0 35.62	327 8 14.51	. .	.78	− 0 16.08	19 47 48.32	+ 6 1 52.33	8.13	+15.12
− 0 0.13	− 1 10.32	308 5 36.00	. .	+ 9.78	+ 0 0.41	20 9 34.19	− 13 0 46.18	+ 9.42	+23.14

NADIR POINTS.				
A.	B.	C.	D.	Means
	July	24, 0h.		° ′
				179 59
62″2	64″0	58″2	59″6	61″00
62.0	63.9	58.6	59.0	60.88
61.3	63.5	59.2	59.2	60.80
61.9	63.6	59.0	59.2	60.92
61.5	63.5	59.2	59.1	60.82
61.78	63.70	58.84	59.22	60.88
	July	26,	Night.	179 59
60.0	59.0	64.0	63.5	61.62
59.2	58.2	63.0	62.8	60.80
59.8	59.2	63.3	62.0	61.08
59.5	60.5	63.7	63.0	61.70
59.8	60.0	63.3	62.0	61.27
59.66	59.38	63.47	62.66	61.29
	July	29,	16.5h.	179 59
60.4	62.4	58.5	57.5	59.70
60.6	62.5	58.2	57.5	59.70
60.8	63.0	58.3	57.2	59.82
60.6	62.6	58.1	57.1	59.60
60.4	62.5	58.2	57.5	59.65
60.56	62.60	58.26	57.36	59.69
	July	29,	23.5h.	179 59
61.0	62.0	58.8	57.5	60.05
61.2	63.0	58.5	57.6	60.08
61.0	63.0	58.6	57.7	60.08
61.0	63.0	58.6	57.7	60.07
60.8	63.1	58.2	57.6	59.92
61.00	63.00	58.54	57.62	60.04
	July	31,	Night.	179 59
60.0	59.0	63.0	62.6	61.15
60.3	59.2	63.7	63.3	61.62
59.8	59.5	63.2	62.2	61.18
60.0	60.0	63.8	63.0	61.70
60.0	59.6	63.4	63.0	61.50
60.02	59.46	63.42	62.82	61.43

Object.	COR. IN Æ.	Observed Vertical Semi-diameters.
	Semi-diam.	
	m. s.	′ ″
Venus .	— 0 0.45	
Venus .	— 0 0.45	

July 25. Error of Runs, —0″40.
" 26. do. do. +0.11.
" 29. do. do. 0.83; Mic. coincidence, 40r.120.
" 30. do. do. 0.45.
" 31. do. do. +0.53.
" 30. Wind too high to observe for nadir point.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE& MICROMETER READINGS.						Barometer.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.	
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.
July 31	1	61^1 Cygni	11.6	25.6	39.6	53.3	7.3	21.3	35.0	20 59 53.39	. . . .	..	..	..	. .	. .	29.956
	2	ζ Cygni	38.5	51.3	3.6	16.3	28.5	41.5	54.1	21 6 16.26	350 42 42.6	44.0	42.3	43.0	42.98	. .	
	3	α Cephei	37.7	1.3	24.1	47.3	10.8	34.0	57.1	21 14 47.47	23 2 24.8	16.0	18.5	19.6	19.72	. .	
	4	β Aquarii	47.5	58.5	9.5	20.5	31.3	42.5	53.4	21 23 20.46	314 52 56.0	56.9	57.0	57.3	56.80	. .	
	5	ε Pegasi	57.5	8.5	19.7	30.7	41.8	53.0	4.0	21 36 30.74	330 17 32.1	34.3	33.3	33.5	33.30	. .	
	6	α Aquarii	13.0	24.0	34.7	45.6	56.5	7.4	18.5	21 57 45.67	320 3 31.8	35.6	37.4	35.3	35.02	. .	29.950
	7	ζ Pegasi	6.9	18.1	29.0	40.1	51.2	2.5	13.7	22 33 40.21	331 8 57.0	57.0	56.0	56.5	56.62	. .	29.920
	8	α Piscis Aust.	23.0	35.7	48.5	1.0	13.6	26.5	39.2	22 49 1.07	290 42 57.5	56.2	60.6	58.1	58.10	. .	29.920
	9	α Pegasi	24.9	36.4	47.4	59.0	10.1	21.5	32.5	22 56 58.83	335 29 45.0	49.2	45.3	45.6	46.28	. .	29.926
Aug. 1	10	ε Ursæ Minoris	..	1.0	21.2	43.0	4.2	26.5	..	17 1 43.18	43 22 41.2	34.2	37.1	37.5	37.50*d*	. .	30.000
	11	α Herculis	..	8.0	19.2	30.2	41.4	53.0	..	17 7 30.36	335 41 9.8	14.0	12.1	11.0	11.72	. .	30.000
	12	β Draconis	55.2	13.2	31.4	49.1	7.0	25.0	43.0	17 26 49.13	13 31 32.5	28.5	28.2	28.8	29.40*d*	. .	30.007
	13	δ Ursæ Minoris	29.0							18 20 13.91	47 41 35.8	27.5	30.4	22.2	31.48	. .	
	14			39.0							29.1	20.7	24.3	24.2	24.58	. .	
	15				41.0						26.2	18.1	21.0	21.1	21.60	. .	30.020
	16					47.0					25.5	17.1	20.3	20.6	20.88	. .	
	17						51.0				25.5	17.1	20.3	20.6	20.88	. .	
	18							56.5			28.2	20.2	23.6	23.6	23.88	. .	
2	†19	Venus, 2d and N. L.	50.0	2.0	13.7	25.6	37.4	49.4	1.3	6 32 25.63	343 28 16.8	17.0	17.4	14.1	16.32	. .	30.310
3	†20	Sun, 1st and N. L.	38.8	50.7	1.9	13.6	24.7	36.6	57.7	8 52 14.86	338 52 49.2	53.6	54.0	51.3	52.02	. .	30.310
	†21	Sun, 2d L.	51.7	3.3	14.8	26.4	37.8	49.4	0.9	8 54 26.31	. . . .	..	..	..	. .	. .	
	22	α Serpentis	1.1	12.2	23.3	34.3	45.4	56.3	7.4	15 36 34.29	328 1 49.0	52.8	52.0	52.9	51.68	. .	30.270
	23	ζ Ursæ Minoris	45.3	40.5	..	..	..	15.5	9.6	15 49 27.72	39 21 48.6	41.8	46.8	46.1	45.82	. .	
	24	β^1 Scorpii	48.5	0.0	11.5	23.5	35.0	46.5	58.0	15 57 23.29	301 45 0.0	1.9	6.1	6.0	3.50	. .	
	25	δ Ophiuchi	37.1	48.2	59.2	10.2	21.1	32.1	43.4	16 6 10.19	317 49 37.4	38.0	42.0	42.7	40.02	. .	30.260
	26	α Scorpii	16.0	28.1	40.1	52.0	4.8	17.0	29.1	16 19 52.44	295 3 9.0	10.5	13.0	13.0	11.38	. .	
	27	ε Ursæ Minoris	38.0	0.0	21.2	43.0	4.3	26.5	47.6	17 1 42.94	43 22 42.5	37.0	39.0	40.7	39.80	. .	30.260
	28	α Ophiuchi	7.0	18.4	29.5	40.6	51.8	3.3	14.5	17 27 40.73	333 47 37.3	39.4	40.2	41.0	39.48	. .	30.260
	29	Moon, 1st and S. L.	50.2	2.2	14.5	26.5	38.5	50.5	2.5	17 45 26.41	301 15 17.5	22.3	25.8	26.3	22.98	. .	30.260
	30	μ^1 Sagittarii	52.4	4.3	16.0	27.5	39.1	51.2	3.0	18 4 27.64	300 2 27.6	28.5	31.3	32.5	29.98	. .	30.260
	31	λ Sagittarii	46.2	58.5	10.5	22.5	34.5	46.7	59.0	18 18 22.56	295 38 20.0	21.3	23.5	23.5	22.08	. .	30.260
	32	α Lyræ	54.7	9.0	22.8	36.7	50.5	4.7	18.9	18 31 36.76	395 45 19.2	20.2	21.3	19.3	20.00	. .	30.260
	33	β Lyræ	57.6	51.0	4.1	17.2	30.1	53.1	6.5	18 44 17.09	354 18 2.2	2.7	1.8	3.0	2.42	. .	30.260
	34	ζ Aquilæ	39.9	51.1	2.2	13.5	25.0	36.5	47.7	18 58 13.70	334 45 25.0	28.3	27.0	26.7	26.75	. .	
	35	δ Aquilæ	5.1	16.3	27.0	38.0	49.0	59.8	11.0	19 17 38.03	323 56 1.8	6.8	4.3	5.3	4.55	. .	30.258
	36	β Aquilæ	5.9	17.0	28.0	39.0	50.0	1.0	12.0	19 47 38.99	. . . .	..	..	..	. .	. .	
	37	α^2 Capricorni	50.9	2.2	13.4	25.0	36.0	47.1	58.5	20 9 24.73	308 6 42.4	47.1	50.3	51.0	47.70	. .	
	38	Venus, 2d and N. L.	58.0	9.8	21.8	33.6	45.2	57.2	9.3	6 37 33.56	343 26 54.4	56.5	55.1	54.3	55.08	. .	30.294
	39	Venus, S. L. (Mic.4)	..	..	..	..	..	..	..	. . . .	" " "	"	"	"	"	39.123	
4	†40	Sun, 1st & S. L. (Mic.2)	30.3	42.1	53.8	5.0	16.6	28.1	39.8	8 56 5.10	338 20 3.0	8.0	5.6	1.6	4.55	40.123	30.276
	†41	Sun, 2d & N. L. (Mic.6)	43.0	54.8	6.0	17.8	29.0	40.8	52.1	8 58 17.64	" " "	"	"	"	"	44.383	30.276
	†42	α Leonis	27.2	39.0	50.0	1.2	12.5	23.2	35.2	10 0 1.19	333 49 41.7	46.1	45.5	43.7	44.25	. .	30.256
	†43	12 Canum Venat.	..	..	..	..	54.2	8.4	22.3	12 49 8.30	0 15 29.6	30.8	29.9	29.9	30.05	. .	
	44	Polaris, S. P.							10.0	13 2 39.33	52 35 38.6	31.0	37.6	36.0	35.80	. .	30.214
	45							8.0			52.3	44.3	50.0	48.5	48.78	. .	
	46						2.0				58.6	50.8	56.2	55.0	55.15	. .	
	47					56.0					60.1	52.6	58.2	56.7	56.90	. .	30.208
	48				53.0						57.3	49.9	55.3	54.2	54.18	. .	
	49		47.0								36.4	29.3	35.5	33.4	33.65	. .	30.206
	50	α Virginis	24.2	35.9	..	58.0	9.2	20.2	31.0	13 16 59.75	310 45 53.1	55.3	58.2	56.4	55.75	. .	
	51	α^2 Capricorni	51.5	2.5	13.2	25.3	36.0	47.0	58.5	20 9 24.71	308 6 52.4	50.1	51.3	50.5	51.08	. .	30.156
	†52	α Cygni	..	..	..	4.9	21.0	36.2	51.2	20 36 28.33	5 50 31.9	29.7	30.0	32.1	30.92	. .	30.158

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 17*h*.	0*s*.
	s.	s.	s.	s.	
Aug. 1	+0.117	+0.200	+0.330	*s* 9.880	*g* .009
3	0.117	0.200	0.330	9.138	.005
4	+0.294	+0.300	+0.230	*s* 9.075	*g* .001

19. Faint and very unsteady.
20, 21. Badly defined and very unsteady.
40, 41. Beautifully defined and steady.
42. Very faint and tremulous.
43. Observed for declination at wire VII.
52. Observed for declination at wire VI.

)RRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
. .	. . .	. . . .	. .	+ 9.78	+ 0 0.68	21 0 3.85	. . . .	+ 6.70	+48.83
0.12	— 0 9.07	350 42 33.79	61.43	.78	0 0.61	21 6 26.65	+ 29 36 11.61	6.47	38.45
0.12	+ 0 23.57	23 2 43.47	. .	.78	0 1.20	21 14 58.45	+ 61 56 21.23	1.13	44.54
0.19	— 0 55.66	314 52 1.33	. .	.78	0 0.43	21 23 30.67	— 6 14 20.85	8.92	39.43
0.07	0 31.38	330 17 1.99	. .	.78	0 0.49	21 36 41.01	+ 9 10 39.81	8.13	43.55
0.10	0 46.43	320 2 48.49	. .	.78	0 0.44	21 57 55.89	— 1 3 33.69	8.69	46.22
0.00	0 30.58	331 8 26.42	. .	.78	0 0.49	22 33 50.48	+ 10 2 4.24	8.37	53.85
0.18	2 25.62	290 40 32.30	. .	.78	0 0.38	22 49 11.23	— 30 25 49.88	9.77	48.11
0.04	— 0 25.33	335 29 20.99	. .	.78	0 0.51	22 57 9.12	+ 14 22 58.81	+ 8.37	+57.89
0.01	+ 0 52.37	43 23 29.86	60.00	.88	0 3.43	17 1 56.49	+ 82 17 9.11	— 25.06	—39.91
0.07	— 0 25.08	325 40 46.71	. .	.88	0 0.42	17 7 40.66	+ 14 34 25.96	+ 7.92	30.88
0.00	+ 0 13.37	13 31 42.77	. .	.88	0 0.92	17 26 59.93	+ 52 25 22.02	+ 2.90	31.32
0.05	0 50.59	47 42 22.02	. .	.87	1 41.01	18 22 4.79	+ 86 36 0.67	— 81.62	12.53
0.05	0 56.33	20.86	. .						
0.06	0 59.81	21.35	. .						
0.06	1 0.02	21.84	. .						
0.06	1 0.03	21.85	. .						
0.05	+ 0 56.79	20.62	. .						
0.30	— 0 21.09	343 27 54.93	59.87	.19	0 0.56	6 32 34.92	+ 22 21 34.31	. .	. .
0.26	16 5.73	338 36 46.55	. .	.18	0 0.53	8 53 30.30	+ 17 30 25.93	. .	. .
. .	. . .	. . . .	. .	.18	0 0.53				
0.26	— 0 34.89	328 1 17.05	61.13	.15	0 0.48	15 36 43.92	+ 6 54 55.17	+ 9.13	51.35
0.16	+ 0 45.99	39 22 31.65	. .	.15	0 2.42	15 49 39.29	+ 78 16 9.77	— 8.17	60.62
0.01	— 1 30.38	301 43 33.11	. .	.15	0 0.39	15 57 32.83	— 19 22 48.77	+ 10.55	38.74
0.30	0 50.75	317 48 49.57	. .	.14	0 0.43	16 6 19.76	— 3 17 32.31	9.52	42.19
0.04	— 1 59.64	295 1 11.70	. .	.14	0 0.39	16 20 1.97	— 26 5 10.18	+ 10.97	31.38
0.30	+ 0 53.31	42 23 33.41	. .	.14	0 4.05	17 1 56.13	+ 82 17 11.53	— 26.06	39.91
0.08	— 0 27.80	333 47 11.76	. .	.14	0 0.50	17 27 50.37	+ 12 40 49.58	+ 7.99	25.86
0.09	+32 56.11	301 48 19.00	. .	.13	0 0.39	17 46 47.80	— 19 18 2.88	. .	. .
0.11	— 1 36.86	300 0 53.23	. .	.13	0 0.39	18 4 37.16	— 21 5 28.65	10.37	— 7.27
0.14	1 57.77	295 36 24.45	. .	.13	0 0.38	18 18 32.07	— 25 29 57.43	10.68	+ 6.92
0.08	0 0.23	359 45 19.69	. .	.13	0 0.69	18 31 46.56	+ 38 38 57.81	5.01	— 8.49
0.01	0 5.66	354 17 56.75	. .	.13	0 0.64	18 44 26.86	+ 33 11 34.89	5.63	— 5.00
0 0.10	0 26.51	334 45 0.14	. .	.12	0 0.51	18 58 23.33	+ 13 38 38.26	7.55	+ 1.17
0 0.21	0 41.32	323 53 23.44	. .	.12	0 0.46	19 17 47.61	+ 2 49 1.56	8.44	8.63
. . .	. . .	. . . .	. .	.12	0 0.47	19 47 48.58	. . . .	8.13	. .
0 0.18	1 11.68	308 5 35.84	. .	.12	0 0.41	20 9 34.26	— 13 0 46.04	9.40	+23.00
0 0.01	0 14.74	343 26 38.44	58.79	.08	0 0.67	6 37 42.86	+ 22 20 18.90	. .	. .
0 13.80	0 14.74								
4 37.79	0 19.04	338 20 54.29	. .	.08	0 0.63	8 57 21.08	+ 17 14 34.75	. .	. .
6 54.88	0 18.55		. .	.08	0 0.63				
0 0.24	0 27.11	333 49 17.38	. .	.08	+ 0 0.60	10 0 10.87	+ 12 42 57.84	11.61	—58.44
0 0.09	— 0 0.21	0 15 29.75	61.44	.08	— 0 27.38	12 48 50.00	+ 39 9 7.56	10.22	—79.47
0.08	+ 1 33.49	52 37 9.37	. .	.08	+ 1 57.50	13 4 45.91	+ 88 29 12.87	16.32	+81.78
0.04	1 21.72	10.54	. .						
0.01	1 14.15	9.31	. .						
0.01	1 11.94	8.85	. .						
0.02	1 14.74	8.92	. .						
0.08	+ 1 35.21	8.94	. .						
0.17	— 1 4.60	310 44 50.98	. .	.08	— 0 1.41	13 17 7.42	— 10 21 31.21	10.44	—65.29
0.16	— 1 11.75	308 5 39.17	59.89	.07	+ 0 0.46	20 9 34.24	— 13 0 41.47	9.40	+22.96
0.09	+ 0 5.78	5 50 36.79	. .	+ 9.07	— 0 22.20	20 36 15.20	+ 44 44 16.50	+ 4.36	+30.19

NADIR POINTS.				
A.	B.	C.	D.	Means
	Aug.1.			° ′ 179 59
61″2	63″1	58″0	57″9	60″05
61.0	63.2	57.7	58.0	59.98
61.2	62.9	58.1	57.8	60.00
60.8	63.0	58.0	58.0	59.95
61.0	63.0	58.3	57.8	60.02
61.04	63.04	58.02	57.90	60.00
	Aug.3,	Day.		179 59
59.0	58.8	63.1	61.4	60.58
59.0	58.0	62.3	60.7	60.00
58.8	58.4	61.2	60.0	59.60
58.8	58.5	62.3	60.2	59.95
58.2	58.0	61.3	59.5	59.25
58.76	58.34	62.04	60.36	59.87
	Aug 3,	Night.		179 59
59.7	60.0	63.5	62.0	61.30
59.6	59.8	63.0	61.0	60.85
60.1	60.0	63.8	61.8	61.42
59.9	60.1	63.2	61.7	61.23
59.3	59.7	63.1	61.3	60.85
59.72	59.92	63.32	61.56	61.13
	Aug.3,	7*h*.		179 59
58.5	62.6	56.9	56.9	58.72
58.5	62.6	57.0	57.0	58.78
58.6	62.5	57.0	57.1	58.80
58.4	62.6	57.1	57.0	58.78
58.5	62.6	57.2	57.2	58.87
58.50	62.58	57.04	57.04	58.79
	Aug.4,	13.5*h*.		179 59
61.1	64.8	60.6	59.3	61.45
60.5	64.1	61.0	60.0	61.40
60.5	64.5	61.0	60.0	61.50
60.5	64.1	61.2	60.0	61.45
60.5	64.2	60.9	60.0	61.40
60.62	64.34	60.94	59.86	61.44
	Aug.4,	Night.		179 59
58.8	62.8	58.4	59.0	59.75
59.0	63.0	58.5	59.1	59.90
59.2	63.0	58.6	59.0	59.95
59.0	63.1	58.7	59.0	59.95
58.9	62.8	58.8	59.2	59.92
58.97	62.94	58.60	59.06	59.89

bject.	COR. IN Æ.	Observed Vertical Semi-diameters.
	Semi-diam.	
	m. s.	′ ″
ıus .	— 0 0.46	
on .	+ 1 11.87	
ıus .	— 0 0.45	0 6.90

Aug. 1. Error of Runs, +0″27;
" 3. do. do. 0.69; Mic. coincidence, 40r125.
" 4. do. do. +0.57; do. { 40.123. 40.128.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.
Aug. 4	1	61¹ Cygni	12.5	26.5	40.3	53.8	8.0	23.0	..	20 59 47.35	359 6 21.2	30.4	30.0	29.0	29.12	. .	
	2	61² Cygni, (Mic. 4) . .	13.6	27.4	41.1	55.2	9.2	24.1	37.5	20 59 55.44	“ “ “	“	“	“	“	40.006	30.154
	3	ζ Cygni	39.2	52.0	4.2	17.0	29.6	42.2	55.0	21 6 17.03	350 42 41.2	45.8	44.6	44.8	44.10	. .	30.152
	4	α Cephei	..	56.0	20.0	45.2	11.2	35.0	58.0	21 14 57.57	23 2 22.1	15.8	19.5	19.9	19.32	. .	30.154
	5	β Cephei	57.5	30.2	1.8	33.8	5.3	37.2	9.3	21 26 33.59	30 59 13.3	6.8	8.7	9.3	9.52	. .	30.148
	6	ε Pegasi	58.0	9.2	20.3	31.3	42.0	53.2	4.4	21 36 31.20	330 17 29.1	36.2	33.2	33.9	33.10	. .	30.146
	7	α Aquarii, (Mic. 4) . .	13.3	24.4	35.3	46.2	57.0	8.1	19.3	21 57 46.21	320 1 29.7	36.9	37.2	36.4	35.05*d*	43.602	30.138
	8	Saturn, 1st and N. L.	34.0	..	56.8	..	19.0	..	41.1	22 5 8.45	307 41 16.8	21.5	22.2	21.5	20.50	. .	30.136
	9	Saturn, 2d	..	46.8	..	9.0	..	31.7	..								
	†10	Venus, 2d L.	6.1	18.2	30.0	42.1	54.5	6.7	18.6	6 42 42.31	. . . . .	..	..	..	..	. .	
5	†11	Sun, 1st L.	21.6	32.9	44.2	55.7	7.5	18.9	30.1	8 59 55.84							
	12	Sun, 2d L.	33.9	45.5	56.8	8.3	20.0	31.4	42.8	9 2 8.39	. . . .	..	..	..	..	. .	
	†13	α Scorpii	16.0	28.1	40.1	52.5	4.5	17.0	29.0	16 19 52.46	295 3 11.0	11.6	14.6	16.0	13.30	. .	30.051
	14	γ Draconis	1.5	19.0	36.8	54.5	11.9	29.7	47.0	17 52 54.34	12 37 6.1	1.7	5.0	3.0	3.95	. .	30.053
	15	μ¹ Sagittarii	52.5	4.1	15.5	27.6	39.1	51.2	3.0	18 4 27.57	300 2 27.6	29.2	30.6	33.0	30.10	. .	30.060
	16	β Lyræ	37.6	50.7	3.9	17.0	30.0	43.1	56.1	18 44 16.91	354 18 4.6	6.0	4.5	4.8	4.98	. .	30.078
	17	ζ Aquilæ	40.0	51.0	2.4	13.5	24.6	36.3	47.3	18 58 13.59	334 45 27.0	31.2	29.5	29.8	29.38	. .	30.078
	18	δ Aquilæ	4.9	16.0	26.9	38.0	48.9	0.0	11.0	19 17 37.96	323 56 2.0	7.6	4.5	5.0	4.78	. .	30.078
	19	α Aquilæ	36.9	48.0	59.0	10.0	21.0	32.1	43.2	19 43 10.03	329 35 12.0	13.0	13.0	13.0	12.75	. .	30.080
	20	β Aquilæ	6.0	17.0	28.0	39.0	50.0	1.0	12.0	19 47 39.00	327 8 52.0	55.5	55.2	55.9	54.65	. .	30.086
	21	Moon, 1st and N. L. .	30.7	42.5	54.5	6.2	17.8	29.9	41.5	19 54 6.16	304 52 8.2	12.5	17.0	14.0	12.92	. .	30.080
	22	α² Capricorni	50.9	2.2	13.4	24.5	35.7	47.0	58.5	20 9 24.60	308 6 45.8	48.5	52.0	52.0	49.58	. .	
	23	61¹ Cygni	11.9	26.0	40.0	53.8	7.6	21.6	35.8	20 59 53.81	359 6 28.6	30.4	30.1	29.0	29.52	. .	30.080
	24	β Aquarii	48.0	59.0	10.0	21.0	32.0	43.0	54.0	21 23 21.00	314 52 56.6	60.3	58.2	61.0	59.02	. .	30.080
	25	ε Pegasi	57.8	9.0	20.0	31.1	42.0	53.2	4.5	21 36 31.09	330 17 32.3	36.5	35.0	36.2	35.00	. .	
	26	α Aquarii	13.3	24.1	35.3	46.4	57.1	8.3	19.1	21 57 46.23	320 3 32.1	37.0	38.0	38.5	36.40	. .	
	27	Venus, 2d and N. L.	14.4	26.5	37.3	50.0	2.0	13.2	25.5	6 47 49.84	343 22 24.7	29.6	29.8	27.0	27.78*d*	. .	30.128
	28	Venus, S. L. (Mic. 4)	..	..	..	..	..	..	..	. . . .	“ “ “	“	“	“	“	39.716	
6	29	α Ophiuchi	9.6	18.0	29.2	40.0	51.2	3.0	14.1	17 27 40.30	333 47 35.5	39.8	39.6	39.0	38.48	. .	30.100
	†30	μ¹ Sagittarii	..	..	..	27.5	39.1	51.5	3.0	18 4 45.28	300 2 25.0	29.0	31.6	30.8	29.10	. .	30.006
	31			37.2							47 43 32.0	26.0	30.0	30.0	29.50*d*	36.515	30.110
	32				40.0						“ “ “	“	“	“	“	36.404	
	33	δ Ursæ Minoris, (Mic. 4)				45.5				18 21 45.24	“ “ “	“	“	“	“	36.356	
	34						48.5				“ “ “	“	“	“	“	36.391	
	35							55.0			“ “ “	“	“	“	“	36.480	
	†36	α Lyræ	54.2	8.1	22.2	36.1	50.0	4.7	18.4	18 31 36.24	359 45 19.1	21.4	20.1	18.8	19.85	. .	30.112
	37	γ Aquilæ	16.2	27.4	39.0	49.9	1.0	12.0	23.1	19 38 49.80	331 21 40.2	46.6	45.0	44.0	43.95	. .	30.106
	38	α Aquilæ	36.5	48.0	58.8	9.5	21.0	32.0	43.0	19 43 9.83	329 35 9.0	13.6	13.8	12.2	12.15	. .	30.106
	39	β Aquilæ	5.4	16.4	27.6	38.3	49.5	0.5	12.0	19 47 38.53	327 8 47.2	54.6	53.5	51.7	51.75	. .	30.106
	40	α Cygni	18.1	33.5	49.0	4.2	19.3	35.2	50.8	20 36 4.30	5 50 32.1	30.6	31.6	34.0	32.08	. .	30.112
	†41	Moon, 1st and N. L. (Mic. 2.)	5.0	16.8	28.0	39.9	51.1	3.0	14.7	20 57 39.79	308 17 6.8	10.8	10.8	10.1	9.62	46.735	
	42		..	..	..	..	..	..	..	. . . .	“ “ “	“	“	“	“	46.805	
	43		..	..	..	..	..	..	..	. . . .	“ “ “	“	“	“	“	46.856	
	†44	Moon, 2d L. (Mic. 6)	..	39.2	51.0	2.8	14.0	25.8	37.1	21 0 8.32	“ “ “	“	“	“	“	. .	30.110
	45	α Andromedæ . . .	42.1	55.0	7.2	20.0	32.0	44.8	57.0	0 0 19.73	349 21 7.0	11.4	9.1	8.1	8.90	. .	30.104
	†46		26.0								49 34 35.3	30.4	34.4	35.3	33.85*d*	40.570	30.106
	47			30.0							“ “ “	“	“	“	“	40.225	
	48				20.0						“ “ “	“	“	“	“	40.015	
	49	Polaris, (Mic. 4) .				16.0				1 4 16.29	“ “ “	“	“	“	“	39.910	30.106
	50						10.0				“ “ “	“	“	“	“	39.975	
	51							8.0			“ “ “	“	“	“	“	40.200	
	†52								4.0		“ “ 35.5	30.8	34.9	35.2	34.10	40.518	30.110

DATE.	VALUE OF m.	n.	c.	CLOCK. At 17*h*.	H. Rate. 0*s*.
	s.	s.	s.	s.	
Aug. 4	+0.294	+0.300	+0.230	9.075	*g* .001
5	0.294	0.300	0.230	9.142	*l* .005
6	+0.294	+0.300	+0.230	9.376	*l* .012

10. Planet very unsteady and indistinct.
11. Badly defined and very unsteady.
13. Unsteady.
30. Observed for declination at wire VII.
36. Perfectly defined and steady.
41 to 44. Beautifully defined, within an hour of full moon.
46 to 52. Very unsteady.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.		NADIR POINTS.				
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.	A.	B.	C.	D.	Means
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″					° ′
− 0 0.19	− 0 0.90	359 6 28.03	59.89	+ 9.07	+ 0 7.76	21 0 4.18	+ 38 0 7.39	+ 6.67	+47.55		Aug. 5	Night.		179 59
0 4.12	0 0.90	359 6 24.13	. .	.07	0 0.82	21 0 5.33	+ 38 0 3.49	6.67	47.55	60″3	59″0	64″7	61″9	61″48
− 0 0.14	− 0 9.85	350 42 34.61	. .	.07	0 0.73	21 6 26.83	+ 29 36 13.97	+ 6.44	37.33	60.5	60.5	64.5	62.0	61.87
+ 0 0.12	+ 0 24.00	23 2 43.44	. .	.07	. .	. . . . .	+ 61 56 22.80	. .	43.08	60.2	60.0	64.3	61.3	61.45
0 0.15	+ 0 33.91	30 59 43.58	. .	.07	0 1.78	21 26 44.44	+ 69 53 22.94	− 2.28	47.10	60.1	60.0	64.3	61.5	61.48
0 0.09	− 0 32.24	330 17 0.95	. .	.07	0 0.58	21 36 40.85	+ 9 10 40.31	+ 8.08	42.81	60.0	59.7	64.1	61.5	61.32
1 59.50	0 47.32	320 2 47.23	. .	.07	0 0.52	21 57 55.80	− 1 3 33.41	8.63	+45.70	60.22	59.84	64.38	61.64	61.52
+ 0 0.12	1 21.41	307 39 55.51	. .	.07	0 0.46	22 5 17.98	− 13 26 25.15	. .	. .					
. . .	. . .	. . . .	. .	.09	0 0.67	6 42 51.62	. . . .	. .	. .					
. . .	. . .	. . . .	. .	.10	0 0.63	9 1 11.84	. . . .	. .	. .					
− 0 0.06	− 1 57.03	295 3 13.30	61.52	.14	0 0.40	16 20 2.00	− 26 5 6.26	11.00	−31.39					
− 0 0.37	+ 0 12.39	12 37 15.97	. .	.15	0 1.04	17 53 4.53	+ 51 30 54.10	2.92	23.81					
+ 0 0.17	− 1 35.38	300 0 54.89	. .	.15	0 0.42	18 4 37.14	− 21 5 27.38	10.39	7.26					
− 0 0.02	0 5.54	354 17 59.42	. .	.15	0 0.77	18 44 26.83	+ 33 11 37.15	5.64	− 5.45		Aug. 5	6*h.*		179 59
+ 0 0.17	0 26.16	334 45 3.05	. .	.15	0 0.60	18 58 23.34	+ 13 38 40.78	7.56	+ 0.84	60.2	63.5	61.1	58.0	60.70
0 0.32	0 40.36	333 55 24.74	. .	.16	0 0.54	19 17 47.66	+ 2 49 2.47	8.44	8.39	59.8	63.7	61.0	57.8	60.58
0 0.28	0 32.55	329 34 40.78	. .	.16	0 0.58	19 43 19.77	+ 8 28 18.21	8.06	15.89	60.0	63.8	60.8	57.9	60.62
+ 0 0.03	− 0 35.81	327 8 18.87	. .	.16	0 0.56	19 47 48.72	+ 6 1 56.60	8.13	14.40	60.1	63.6	60.7	58.1	60.62
− 0 0.42	+31 53.85	305 24 6.35	. .	.16	0 0.45	19 55 27.97	− 15 42 15.92	. .	. .	60.3	63.5	60.8	58.0	60.65
0 0.29	− 1 10.64	308 5 38.65	. .	.16	0 0.45	20 9 34.21	− 13 0 43.62	9.40	22.92	60.08	63.62	60.88	57.96	60.63
− 0 0.17	0 0.86	359 6 28.49	. .	.16	0 0.82	21 1 3.79	+ 38 0 6.22	6.66	47.24					
+ 0 0.35	0 55.69	314 52 3.78	. .	.16	0 0.49	21 23 30.65	− 6 14 18.49	8.87	38.94					
+ 0 0.14	0 31.68	330 17 3.46	. .	.16	0 0.58	21 36 40.83	+ 9 10 41.19	8.07	42.63					
− 0 0.21	0 46.47	320 2 49.72	. .	.17	0 0.52	21 57 55.92	− 1 3 32.55	8.62	+45.55					
+ 0 0.01	0 14.45	343 22 6.31	60.63	.29	0 0.67	6 47 59.65	+ 22 15 44.96	. .	. .					
− 0 14.03	0 14.45													
+ 0 0.09	0 27.16	333 47 11.45	60.32	.38	+ 0 0.59	17 27 50.27	+ 12 40 50.38	8.03	−26.20					
− 0 0.12	− 1 34.95	300 0 54.03	. .	.39	− 0 17.17	18 4 37.50	− 21 5 27.04	+ 10.39	7.26					
2 4.12	+ 0 56.76	47 42 22.14	. .								Aug. 6	19*h.*		179 59
2 7.93	1 0.11	21.68	. .							59.7	63.0	59.0	59.5	60.30
2 9.57	1 0.32	20.35	. .	.39	+ 0 8.81	18 22 3.44	+ 86 36 0.32	− 80.08	13.75	59.9	63.0	59.1	59.4	60.35
2 8.37	1 0.35	21.48	. .							59.8	63.0	59.1	59.4	60.32
2 5.32	+ 1 0.35	21.30	. .							59.7	62.9	59.2	59.6	60.35
0 0.09	− 0 0.24	359 45 19.52	. .	.39	0 0.83	18 31 46.46	+ 38 38 58.45	+ 5.04	− 9.19	59.8	63.0	59.0	59.4	60.30
− 0 0.19	0 30.28	331 21 12.48	. .	.41	0 0.58	19 38 59.79	+ 10 14 51.41	7.81	+13.10	59.78	62.98	59.08	59.46	60.32
+ 0 0.21	0 32.56	329 34 39.80	. .	.41	0 0.57	19 45 19.81	+ 8 28 18.73	8.06	15.74					
0 0.04	− 0 35.79	327 8 16.00	. .	.41	0 0.56	19 47 48.50	+ 6 1 55.03	8.13	14.26					
0 0.12	+ 0 5.68	5 50 37.88	. .	.42	0 0.91	20 36 14.63	+ 44 44 16.81	4.36	29.55					
18 16.16	29 51.83		. .											
18 18.57	29 50.06	309 22 0.79	. .	.42	+ 0 0.46	20 59 1.06	− 12 1 3.07	. .	. .					
+18 23.32	+29 48.19		. .											
. . .	. . .	. . . .	. .	..	− 0 5.29									
− 0 0.04	− 0 10.46	349 21 8.90	. .	.45	+ 0 0.72	0 0 29.90	+ 28 14 37.33	8.58	65.49					
+ 0 15.63	+ 0 42.09	49 35 31.69	. .								Aug. 6	0.5*h.*		179 59
+ 0 3.50	0 55.03	32.50	. .							58.5	61.9	58.2	58.4	59.22
− 0 3.67	1 2.72	33.02	. .							58.0	62.4	58.2	57.9	59.13
0 7.26	1 5.46	32.17	59.18	+ 9.47	+ 0 20.35	1 4 46.11	+ 88 29 12.65	+ 14.63	+81.19	58.3	62.2	58.0	58.0	59.12
− 0 5.04	1 3.24	32.17	. .							58.4	62.4	58.2	57.8	59.20
+ 0 2.99	0 55.96	32.92	. .							58.3	62.4	58.0	58.1	59.20
+ 0 13.86	+ 0 41.57	29.34	. .							58.30	62.26	58.12	58.04	59.18

o.	Object.	COR. IN Æ.	Observed Vertical Semi-diameters.
		Semi-diam.	
		m. s.	′ ″
	Venus .	−0 0.45	
	Moon .	+1 12.20	
	Venus .	−0 0.45	0 7.01

Aug. 4. Error of Runs, +0″57; Mic. coincidence, 40r128.
" 5. do. do. 1.05; " 40.123.
" 6. do. do. +0.78; " 40.122.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THERS.		Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.	Ex.	
			s.	s.	s.	s.	s.	s.	s.	h. m. s.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Aug. 6	†1	Venus, 2d and N. L.	22.6	34.7	46.5	58.5	10.3	22.1	34.0	6 52 58.39	343 19 17.6	21.3	21.9	18.0	19.70	. .	30.172	81.2	86.7	M.
7	†2	Sun, 2d and N. L.	13.2	25.0	36.3	47.9	59.3	10.9	22.0	9 9 47.80	337 48 52.6	54.5	52.8	57.0	54.22	. .	30.176	85.2	89.7	
	3	μ^1 Sagittarii	51.7	3.6	15.5	27.0	38.9	50.0	2.1	18 4 26.97	300 2 27.1	28.6	30.8	26.5	28.25	. .	30.173	81.0	74.4	
	4	α Lyræ	53.8	8.1	22.0	36.0	50.0	4.0	18.0	18 31 35.99	359 45 21.2	21.5	19.3	18.2	20.05	. .	30.173	79.8	74.0	
	5	ζ Aquilæ	39.0	50.2	1.5	12.9	24.0	35.5	46.7	18 58 12.83	334 45 24.5	29.4	24.8	27.0	26.42	. .	30.166	78.8	73.5	
	6	δ Aquilæ	4.2	15.3	26.1	37.0	48.0	59.2	10.0	19 17 37.11	323 56 5.3	10.1	5.6	4.7	6.42	. .	30.166	78.0	73.2	
	7	α Aquilæ	36.0	47.1	58.1	9.1	20.1	31.3	42.5	19 43 9.17	329 35 10.0	11.7	11.2	11.0	10.98	. .	30.170	77.8	72.8	
	8	β Aquilæ	5.1	16.1	27.0	38.0	49.0	0.1	11.1	19 47 38.06	327 8 48.3	53.8	52.6	51.1	51.45	. .	30.170	77.8	72.6	
	9	α^2 Capricorni	50.3	1.8	12.8	24.0	35.1	46.6	58.0	20 9 24.09	308 6 44.0	48.0	50.3	49.0	47.82	. .	30.170	77.5	73.0	
	10	61^1 Cygni	11.3	25.4	39.4	53.2	7.1	21.0	35.0	20 59 53.20	359 6 29.8	31.0	29.2	29.0	29.75	. .	30.162	76.8	73.5	
	†11	ζ Cygni	38.2	51.0	3.1	16.0	28.0	41.2	54.0	21 6 15.93	350 42 43.8	46.2	45.2	45.2	45.10	. .	30.162	76.8	73.0	
	12	α Cephei	37.2	0.5	23.6	47.4	10.5	33.8	57.0	21 15 47.14	23 2 23.8	17.0	20.4	20.5	20.42	. .	30.162	76.8	73.0	
	13	β Cephei	57.2	29.5	0.8	32.9	4.2	36.6	8.4	21 26 32.80	30 59 16.3	9.0	10.8	12.8	12.22	. .	30.162	76.8	73.0	
	14	Moon, 2d and S. L.	13.8	25.3	36.4	48.0	59.2	10.7	22.0	22 1 47.91	313 12 2.8	4.9	5.0	4.0	4.18	. .				
	15	ζ Pegasi	6.8	18.1	29.0	40.4	51.1	2.5	13.6	22 33 40.21	331 8 60.0	61.5	60.0	59.8	60.32	. .	30.150	76.2	72.5	
	†16	α Piscis Aust.	23.0	35.7	48.5	1.1	13.7	26.6	39.5	22 49 1.16	290 42 59.3	60.8	65.4	63.0	62.12	. .			72.7	
8	17	δ Ursæ Minoris, (Mic. 4)			37.0					18 23 14.00	47 40 30.3	23.5	27.1	25.8	26.64d	41.862	30.040	82.6	80.4	H
	18					41.5					" " "	"	"	"	"	41.780				
	19						46.0				" " "	"	"	"	"	41.838				
	20							51.5			29.2	26.0	27.7	25.6	27.12	41.946				
	21	α Lyræ	53.0	7.3	21.1	35.0	49.9	3.1	17.0	18 31 35.07	359 45 21.4	24.6	24.9	20.8	22.92	. .	30.040	82.5	81.0	
	22	γ Aquilæ	15.3	26.4	37.2	48.2	59.2	11.0	22.0	19 38 48.47	331 21 43.3	49.2	47.0	46.2	46.42	. .	30.036	82.0	79.0	
	23	α Aquilæ	..	..	..	..	..	30.8	41.5	19 43 36.15	329 35 12.8	12.0	17.2	15.7	15.68	. .				
	24	β Aquilæ	4.3	15.6	26.5	37.5	48.3	59.3	10.7	19 47 37.46	327 8 51.1	58.0	56.0	54.8	54.98	. .	30.034	82.0	79.3	
	25	α^2 Capricorni	49.2	1.0	12.0	23.5	34.2	45.7	57.0	20 9 23.23	308 6 42.9	51.2	53.0	52.6	49.92	. .	30.030	81.5	79.0	
	26	α Cygni	17.0	32.5	47.8	3.0	18.3	34.0	49.2	20 36 3.11	5 50 35.4	34.2	34.9	37.3	35.45	. .	30.032	81.3	78.3	
	27	61^1 Cygni	10.8	25.0	38.4	52.1	6.2	20.2	34.0	20 59 52.39	359 6 27.8	30.7	29.7	28.4	29.15	. .	30.028	81.0	78.0	
10	28	α Herculis	55.0	6.7	17.5	29.0	40.3	51.7	3.0	17 7 29.03	. . . .	..	..	..	. .	. .				M
	29	α Ophiuchi	5.1	16.2	27.5	38.8	49.9	1.1	12.3	17 27 38.70	. . . .	..	..	..	. .	. .				
	30	γ Draconis	59.3	17.4	34.9	52.2	9.7	27.5	45.1	17 52 52.30	. . . .	..	..	..	. .	. .				
	31	μ^1 Sagittarii	50.6	2.3	14.0	25.3	57.3	49.2	1.0	18 4 25.67	. . . .	..	..	..	. .	. .				
	32	α Lyræ	52.8	7.0	20.9	35.0	49.0	3.0	16.9	18 31 34.94	. . . .	..	..	..	. .	. .				
	33	β Lyræ	36.0	49.1	2.1	15.1	28.0	41.2	54.5	18 44 15.17	. . . .	..	..	..	. .	. .				
	34	δ Aquilæ	3.7	14.5	25.2	36.4	47.5	58.2	9.3	19 17 36.54	. . . .	..	..	..	. .	. .				
	35	γ Aquilæ	15.0	26.0	37.0	48.1	59.1	10.4	22.0	19 38 48.23	. . . .	..	..	..	. .	. .				
	36	α Aquilæ	35.0	46.1	57.0	8.0	19.0	30.3	41.5	19 43 8.13	. . . .	..	..	..	. .	. .				
	37	α^1 Capricorni	25.3	37.0	48.0	59.0	10.0	21.0	32.0	20 8 58.90	. . . .	..	..	..	. .	. .				
	38	α^2 Capricorni	49.2	0.8	12.0	23.0	34.0	45.2	56.0	20 9 22.89	. . . .	..	..	..	. .	. .				
11	†39	Sun, 1st & S. L. (Mic. 2)	..	25.0	36.0	47.5	59.0	10.4	22.0	9 22 53.32	336 21 36.0	40.3	40.2	36.6	38.28	. .	30.090	78.0	81.9	H.
	40	12 Canum Venat.	55.9	10.3	24.3	38.4	52.3	6.5	20.8	12 48 38.36	0 15 27.2	28.5	27.9	27.2	27.70	. .				
	†41	Polaris, S. P.							10.0	13 3 34.50	52 35 36.6	29.2	36.0	33.8	33.90	. .	30.070	80.3	81.2	
	42							7.5			50.0	42.1	48.1	46.9	46.78	. .				
	43						55.0				57.0	49.1	55.0	53.1	53.55	. .				
	44					0.0					58.9	51.3	57.4	55.6	55.80	. .	30.068	80.4	79.6	
	45			43.5							49.8	41.8	47.6	46.2	46.35	. .				
	†46		46.0								36.0	28.4	34.6	32.9	32.98	. .	30.066	80.2	80.9	
	†47	α^2 Capricorni	49.3	0.8	12.0	23.1	34.0	45.3	56.8	20 9 23.04	308 6 43.0	50.4	52.6	51.5	49.38	. .	30.114	74.5	68.1	
	48	α Cygni	15.8	31.5	47.0	2.0	17.3	32.6	48.5	20 36 2.10	5 50 35.9	34.5	34.4	36.7	35.38	. .	30.120	74.0	70.8	
	†49	γ Cephei	36.0	24.5	11.8	59.5	46.8	35.5	23.3	23 32 59.63	37 52 12.3	6.8	9.7	8.7	9.38	. .	30.120	73.7	68.8	
	†50	Venus, 2d and N. L.	4.2	16.1	27.7	39.6	51.5	3.6	15.3	7 18 39.71	342 54 7.0	9.4	10.5	6.5	8.35	. .	30.182	76.4	79.1	M.
12	†51	Sun, 1st and N. L.	0.7	12.2	23.4	34.9	46.2	57.5	8.7	9 26 34.80	336 20 42.4	47.0	44.0	45.7	44.78	. .				
	52	Sun, 2d L.	12.1	23.4	34.9	46.1	57.2	9.0	20.3	9 28 46.14	. . . .	..	..	..	. .	. .				

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 18h.	0s.
	s.	s.	s.	s.	
Aug. 7	+0.294	+0.300	+0.230	s 9.787	l .014
8	0.294	0.300	0.230	10.606	.009
10	0.294	0.300	0.230	10.877	l .004
11	+0.294	+0.300	+0.230	s 10.685	g .003

1. Very faint at wires VI and VII.
2. Limb badly defined.
11. Very unsteady.
16. Observed through a fog; star very faint and unsteady.
39. Observed through a cloud; second limb obscured entirely.
41 to 46. Unsteady at wires VII, II and I. Cloudy at wires IV and III.
47. Exeeedingly unsteady; clouds in the sky.
49. Unsteady.
50. Faint and very unsteady.
51. Very unsteady; observation not good.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	M. s.	H. M. s.	° ′ ″	s.	″
— 0 0.35	— 0 21.40	343 18 57.95	61.53	+ 9.66	+ 0 0.67	6 53 8.27	+ 22 12 35.67	. .	. .
— 0 0.18	16 6.76	337 32 47.28	. .	.79	0 0.62	9 8 51.51	+ 16 26 25.00	. .	. .
+ 0 0.10	1 36.18	300 2 28.25	61.79	.79	0 0.42	18 4 37.18	— 21 5 30.37	+ 10.40	— 7.25
— 0 0.07	0 0.25	359 45 19.73	. .	.80	0 0.83	18 31 46.62	+ 38 38 57.19	5.05	— 9.42
— 0 0.09	0 26.36	334 44 59.97	. .	.80	0 0.60	18 58 23.23	+ 13 38 37.43	7.57	+ 0.53
+ 0 0.19	0 40.73	323 55 25.88	. .	.81	0 0.54	19 17 47.46	+ 2 49 3.34	8.45	8.16
0 0.17	0 32.87	329 34 38.28	. .	.81	0 0.57	19 43 19.55	+ 8 28 15.74	8.06	15.59
+ 0 0.03	0 36.17	327 8 51.45	. .	.82	0 0.56	19 47 48.44	+ 6 1 52.77	8.13	14.12
— 0 0.16	1 11.23	308 5 36.75	. .	.82	0 0.46	20 9 34.37	— 13 0 45.79	9.39	22.84
0 0.10	0 0.87	359 6 28.78	. .	.83	0 0.82	21 0 3.85	+ 38 0 6.24	6.65	46.62
— 0 0.16	— 0 9.15	350 42 35.19	. .	.83	0 0.73	21 6 26.49	+ 29 36 13.25	6.42	36.52
+ 0 0.14	+ 0 23.80	23 2 42.57	. .	.83	0 1.35	21 15 58.32	+ 61 56 21.82	+ 1.09	41.96
+ 0 0.17	0 33.60	30 59 45.59	. .	.83	0 1.60	21 26 44.23	+ 69 53 23.45	— 2.30	45.99
— 0 0.01	+26 51.72	313 38 55.89	. .	.84	0 0.48	22 0 47.31	— 7 27 26.65	. .	. .
0 0.00	— 0 30.85	331 8 29.47	. .	.85	0 0.47	22 33 50.53	+ 10 2 6.93	+ 8.26	52.50
0 0.20	— 2 26.75	290 40 35.17	. .	.85	+ 0 0.37	22 49 11.38	— 30 25 47.37	+ 9.62	+48.20
1 0.55	+ 0 59.03	47 42 26.48	. .						
0 57.75	1 0.24	23.89	61.96	10.61	— 1 22.92	18 22 1.69	+ 86 36 2.95	— 79.51	—14.15
— 0 59.73	0 59.26	25.89	. .						
+ 1 3.42	+ 0 56.06	26.38	. .						
— 0 0.08	— 0 0.24	359 45 22.60	. .	.61	+ 0 0.83	18 31 46.51	+ 38 38 59.89	+ 5.07	— 9.64
— 0 0.16	0 30.08	331 21 16.18	. .	.62	+ 0 0.58	19 38 59.67	+ 10 14 53.47	7.81	+12.79
+ 0 0.16	0 32.31	329 34 43.53	. .	.62	— 0 27.10	19 43 19.67	+ 8 28 20.82	8.06	15.44
+ 0 0.02	0 35.54	327 8 19.46	. .	.62	+ 0 0.56	19 47 48.64	+ 6 1 56.75	8.13	13.98
— 0 0.17	— 1 12.65	308 6 37.10	. .	.62	0 0.45	20 9 34.30	— 13 0 45.61	9.39	22.82
0 0.00	+ 0 5.65	5 50 41.10	. .	.63	0 0.91	20 36 14.65	+ 44 44 18.10	4.36	28.94
0 0.10	— 0 0.86	359 6 28.19	. .	.63	0 0.82	20 59 3.84	+ 38 0 5.48	6.65	+46.32
. . .	. . .	. . . . .	. .	.87	0 0.61	17 7 40.51	. . . . .	8.03	. .
. . .	. . .	. . . . .	. .	.87	0 0.63	17 27 50.20	. . . . .	8.08	. .
. . .	. . .	. . . . .	. .	.88	0 1.04	17 53 4.22	. . . . .	3.04	. .
. . .	. . .	. . . . .	. .	.88	0 0.42	18 4 36.97	. . . . .	10.43	. .
. . .	. . .	. . . . .	. .	.88	0 0.83	18 31 46.65	. . . . .	5.10	. .
. . .	. . .	. . . . .	. .	.88	0 0.77	18 44 26.82	. . . . .	5.70	. .
. . .	. . .	. . . . .	. .	.89	0 0.54	19 17 47.97	. . . . .	8.46	. .
. . .	. . .	. . . . .	. .	.89	0 0.58	19 38 59.70	. . . . .	7.82	. .
. . .	. . .	. . . . .	. .	.89	0 0.57	19 43 19.59	. . . . .	8.06	. .
. . .	. . .	. . . . .	. .	.89	0 0.45	20 9 10.24	. . . . .	9.38	. .
. . .	. . .	. . . . .	. .	.89	+ 0 0.45	20 9 34.23	. . . . .	9.39	. .
14 38.08	+15 27.56	336 22 27.76	. .	.71	— 0 5.06	9 24 4.70	+ 15 16 5.05	. .	. .
— 0 0.12	0 0.25	0 15 27.83	62.32	.70	+ 0 0.83	12 48 49.89	+ 39 9 3.76	10.32	—78.79
+ 0 0.10	1 33.35	52 37 7.35	. .						
0 0.06	1 21.14	7.98	. .						
0 0.02	1 14.07	7.64	. .	.70	1 2.18	13 4 47.38	+ 88 29 15.21	11.74	+80.24
0 0.02	1 11.93	7.75	. .						
0 0.06	1 22.06	8.47	. .						
+ 0 0.11	+ 1 34.92	8.01	. .						
— 0 0.21	— 1 11.78	308 6 49.38	62.02	.68	0 0.45	20 9 34.17	— 13 0 45.38	9.39	22.71
+ 0 0.10	+ 0 5.75	5 50 41.23	. .	.68	0 0.91	20 36 14.69	+ 44 44 18.46	4.36	27.99
— 0 0.29	+ 0 43.79	37 52 52.88	63.19	.67	0 2.58	23 33 12.88	+ 76 46 28.94	+ 0.82	+72.81
— 0 0.04	— 0 22.19	342 53 46.12	. .	.50	0 0.66	7 18 50.43	+ 21 47 22.18	. .	. .
0 0.00	—16 10.67	336 4 34.11	62.42	+ 10.49	0 0.61	9 27 51.57	+ 14 58 10.94	. .	. .
. . .	. . .	. . . . .	. .		+ 0 0.61				

NADIR POINTS.				
A.	B.	C.	D.	Means
	Aug.7,	Day.		° ′ 179 59
61″0	59″4	64″7	62″7	61″95
60.3	59.0	63.9	62.1	61.32
61.0	59.5	64.1	62.0	61.65
60.0	59.0	63.5	62.0	61.13
61.0	59.5	64.1	62.0	61.62
60.66	59.28	64.04	62.16	61.53
	Aug.7,	Night.		179 59
61.4	59.5	64.8	62.0	61.92
60.5	60.5	64.5	62.0	61.88
60.3	60.7	64.8	62.0	61.95
60.3	60.7	64.8	62.0	61.95
60.3	60.3	64.6	62.0	61.80
59.8	60.2	64.0	61.0	61.22
60.43	60.32	64.58	61.83	61.79
	Aug.8,	Night.		179 59
61.4	65.2	60.8	60.6	62.00
61.5	65.2	60.8	60.7	62.05
61.2	65.2	60.6	60.5	61.88
61.3	65.3	60.7	60.5	61.95
61.2	65.3	60.7	60.5	61.92
61.32	65.24	60.72	60.56	61.96
	Aug.	11,	12*h*.	179 59
61.3	65.1	62.2	60.2	62.20
61.4	65.3	62.2	60.4	62.32
61.4	65.3	62.2	60.6	62.38
61.4	65.4	62.1	60.6	62.37
61.4	65.4	62.2	60.3	62.33
61.38	65.30	62.18	60.42	62.32
	Aug.	11,	17*h*.	179 59
61.3	65.3	61.9	59.8	62.08
61.0	65.2	61.5	59.9	61.90
61.1	65.4	61.7	59.9	62.02
61.0	65.4	61.8	60.2	62.10
61.2	65.2	61.8	59.8	62.00
61.12	65.30	61.74	59.92	62.02
	Aug.	11,	23*h*.	179 59
62.2	66.2	62.3	62.0	63.18
62.4	66.0	62.4	62.0	63.20
62.0	66.2	62.2	62.1	63.12
62.4	66.1	62.4	62.2	63.28
62.1	66.3	62.3	62.1	63.20
62.22	66.16	62.32	62.08	63.19
	Aug.	12,	8*h*.	179 59
61.8	66.1	62.7	59.3	62.48
61.9	66.1	62.6	59.3	62.47
61.8	65.9	62.6	59.2	62.38
62.0	65.8	62.5	59.3	62.40
62.0	65.8	62.6	59.2	62.40
61.90	65.94	62.60	59.26	62.42

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	M. s.	′ ″
Venus .	— 0 0.45	
Sun .	1 6.08	
Moon .	— 1 10.91	
Sun .	+ 1 5.73	
Venus .	— 0 0.44	

Aug. 7. Error of Runs, +0″64;
" 8. do. do. 0.62; Mic. coincidence, 40r090.
" 11. do. do. +0.75;
" 12. do. do. —0.07.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.		TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	TH
				I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.
				s.	s.	s.	s.	s.	s.	s.	H. M. s.	° ′ ″	″	″	″	″	Revs.	In.	°
Aug. 12	†1	ε	Ursæ Minoris . . .	35.0	58.0	18.3	40.5	1.3	23.3	45.2	17 1 40.23	43 22 50.5	41.5	45.5	46.5	46.00	. .	30.092	79.
	2	α	Ophiuchi	5.4	17.0	28.0	39.2	50.5	1.9	13.0	17 27 39.29	333 47 42.5	45.5	43.7	45.5	44.30	. .		78.
	3	α	Aquarii	12.3	23.5	34.0	45.5	56.1	7.2	18.0	21 57 45.23	. . . .	..	..	..	. .	. .		
	†4		Saturn, 1st L. . . .	19.8	31.2	42.2	53.8	5.2	16.2	27.6	22 2 53.71	. . . .	..	..	..	. .	. .		
	5	ζ	Pegasi	6.1	17.4	28.1	39.5	50.5	2.0	13.2	22 33 39.54	. . . .	..	..	..	. .	. .		
	6	α	Piscis Aust. . . .	22.6	35.5	48.3	0.9	13.3	26.1	39.0	22 49 0.81	290 43 2.5	3.0	8.0	6.5	5.00	. .	30.078	75.
	7		Venus, 2d and N. L. .	12.3	24.2	36.0	48.0	0.0	11.3	23.2	7 23 47.86	342 47 9.2	14.4	12.6	10.4	11.65	. .	30.080	77.
13	8		Sun, 1st & S. L. (Mic.2)	47.0	58.2	9.2	21.1	32.2	43.8	55.0	9 30 20.93	335 45 27.0	34.0	34.6	28.5	31.02	40.106	30.050	79.
	9		Sun, 2d & N. L. (Mic.6)	58.2	10.0	20.8	32.2	43.1	54.2	6.0	9 32 32.07	" " "	"	"	"	"	44.444	30.050	79.
	†10	12	Canum Venat. . . .	56.2	10.6	24.5	39.0	53.0	..	21.0	12 48 34.05	. . . .	..	..	..	. .	. .		
	†11									16.0		52 35 38.3	31.8	38.2	36.1	36.10	. .	30.004	82.
	12								11.0			49.3	42.0	47.2	45.3	45.95	. .		
	13							10.0				57.3	49.6	55.1	53.3	53.82	. .		
	14		Polaris, S. P. . . .				5.0				13 5 3.71	60.3	52.5	58.1	56.6	56.88	. .	30.002	83.
	15					0.0						57.7	49.9	55.1	53.5	54.05	. .		
	16				51.0							49.9	42.2	47.5	46.2	46.45	. .		
	†17			53.0								35.0	27.5	34.0	31.8	32.08	. .	30.000	84.
	18	α	Virginis, (Mic. 4) . .	..	..	..	56.2	7.4	18.8	29.5	13 17 12.98	310 46 29.4	32.3	34.8	31.9	32.10	39.046		
	19	α	Lyræ	53.2	7.4	21.4	35.2	49.1	3.4	17.0	18 31 35.24	359 45 23.0	25.0	25.3	21.4	23.68	. .	29.994	81.
	†20	α	Piscis Aust. . . .	22.9	36.0	48.2	1.0	13.1	26.5	39.0	22 49 0.96	290 43 0.4	3.5	8.2	4.6	4.18	. .	29.972	78.
	21	α	Pegasi	24.8	36.1	47.2	58.8	10.0	21.2	32.8	22 56 58.70	335 29 45.0	57.0	54.1	53.8	52.48	. .	29.970	77.
	†22	ι	Piscium	..	..	43.5	55.0	6.0	17.0	28.0	23 31 5.90	325 54 51.1	56.6	58.9	56.0	55.65	. .	29.964	77.
	23	α	Andromedæ . . .	42.0	54.5	6.8	19.0	32.0	44.0	56.2	0 0 19.21	349 21 10.9	15.2	14.4	12.1	13.15	. .	29.956	77.
14	†24	η	Lyræ	41.5	55.3	9.6	23.5	37.6	51.8	5.6	19 8 23.56	. . . .	..	..	..	. .	. .		
	25	δ	Aquilæ	4.4	15.4	26.1	37.2	48.0	59.1	10.0	19 17 37.17	323 56 4.0	9.0	6.5	6.4	6.48	. .	29.958	82.
	26	α	Sagittæ	31.4	42.8	54.0	5.9	17.1	28.8	40.0	19 33 5.71	338 46 58.8	56.8	55.6	54.5	55.18	. .	29.956	82.
	27	γ	Aquilæ	16.0	27.1	38.0	49.2	0.4	11.6	22.8	19 38 49.30	331 21 45.4	49.3	47.5	46.8	47.25	. .	29.956	82.
	†28	β	Aquilæ	5.0	16.0	26.7	38.3	49.0	0.2	11.2	19 47 38.06	327 8 53.2	58.4	57.0	51.0	54.90	. .	29.956	82.
	†29		Cygni, 7067 . . .	21.5	34.2	46.5	59.5	11.9	24.8	37.2	20 22 59.38	350 58 22.0	25.3	23.8	22.3	23.35	. .		
	30	α	Cygni	17.8	33.1	48.5	3.9	19.0	34.9	50.4	20 36 3.94	5 50 37.0	35.2	35.0	37.3	36.12	. .		81.
	†31	61¹	Cygni	11.5	25.4	39.3	53.1	7.0	21.0	35.0	20 59 53.19	359 6 31.8	33.5	32.0	30.8	32.02	. .		80.
	†32		Saturn, 1st L. . . .	46.1	57.2	8.3	19.9	31.0	42.4	53.5	22 2 19.77	. . . .	..	..	..	. .	. .		
18	33	γ	Draconis	2.5	20.0	37.3	55.1	12.7	30.4	47.8	17 52 55.11	12 37 6.8	2.5	6.4	3.2	4.72	. .	30.108	75.
	34	μ¹	Sagittarii	53.8	5.4	17.0	28.7	40.5	52.1	4.0	18 4 28.79	300 2 26.0	29.0	30.5	30.0	28.88	. .	30.108	75.
	†35		Saturn, 1st and N. L.	39.0	50.2	1.3	13.0	24.0	35.3	46.5	22 1 12.76	207 18 35.5	39.5	41.7	40.7	39.35	. .	30.132	72.
	†36	α	Piscis Aust. . . .	25.0	38.0	50.0	3.0	16.0	29.0	41.2	22 49 3.17	. . . .	..	..	..	. .	. .		
	37	α	Pegasi	26.9	38.3	49.3	0.8	12.1	23.5	34.8	22 57 0.81	335 29 47.3	43.5	50.1	50.4	47.82	. .	30.124	72.
28	38	δ	Aquilæ	6.8	18.0	29.0	40.0	50.6	1.4	12.6	19 17 39.77	323 56 1.8	10.3	7.9	7.1	6.78	. .	30.196	75.
	39	γ	Aquilæ	18.4	29.7	40.8	52.0	3.0	14.0	25.5	19 38 51.91	331 21 42.2	49.7	47.3	46.5	46.42	. .	30.192	75.
	†40	α	Aquilæ	38.8	50.0	0.8	12.0	22.8	34.0	45.0	19 43 11.91	329 35 12.1	16.5	17.2	14.0	14.95	. .	30.190	74.
	†41	β	Aquilæ	8.0	19.0	30.0	40.8	51.2	2.7	13.9	19 47 40.80	327 8 50.1	57.2	55.9	54.0	54.40	. .	30.188	74.
	†42					10.0						49 56 38.5	30.9	37.0	36.1	35.62	. .	30.190	73.
	43											" " "	"	"	"	"	40.011		
	44											" " "	"	"	"	"	39.960		
	45	λ	Ursæ Minoris, (Mic.4)								20 16 16.50	" " "	"	"	"	"	39.916		
	46											" " "	"	"	"	"	39.992		
	†47							23.0				36.2	29.0	34.4	33.2	33.20	. .	30.188	73.
	†48	β	Cephei	..	..	3.6	..	..	..	..	21 26 3.60	30 59 20.6	15.2	17.4	17.0	17.55	. .	30.200	72.
	†49	ε	Pegasi	0.1	11.2	22.0	33.0	44.2	55.6	6.5	21 36 33.23	330 17 33.5	40.1	37.1	36.0	36.68	. .	30.198	72.
	50		Saturn, 1st and N. L. .	46.9	..	9.0	..	31.5	43.0	..	21 58 17.60	307 2 26.8	31.0	32.9	31.1	30.45	. .	30.194	72.
	51		Saturn, 2d & S.L. (Mic.4)	..	59.2	..	22.0	..	..	55.2	51 58 25.47	" " "	"	"	"	"	39.499	"	"
	52	ζ	Pegasi	9.2	21.0	31.8	43.0	54.0	5.2	16.5	22 33 42.96	331 9 0.5	5.0	3.2	2.0	2.68	. .	30.194	72.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 20h.	0s.
	s.	s.	s.	s.	
Aug. 12	+0.294	+0.300	+0.230	s 10.387	g .009
13	0.294	0.300	0.230	10.132	.012
14	0.294	0.300	0.230	9.848	.016
18	+0.294	+0.300	+0.230	s 7.943	g .017

1. Very faint. Thin clouds passing over.
4. Observation not good. Wind blowing the light. Wires at times hardly visible.
10. Too faint to be observed for declination.
11 to 17. Unsteady.
20. Unsteady and badly defined.
22. Microscopes difficult to read.
24, 29, 31. Observed through a cloud. Very faint.
28. Clouds passing over. Star at times entirely obscured. Observation not good.
32. Steady and well defined.
35. Clouds passing over, nearly obscured at wires I and II.
36 to 40. Very unsteady.
42 to 47. Observed through clouds. Very faint. Micrometer readings taken at 10*m.* 45*s.*, 13*m.* 28*s.*, 19*m.* 20*s.*, and 22*m.* 45*s.*
41, 48. Observed through clouds.
49. Faint. Observation good.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
— 0 0.03	+ 0 52.37	43 23 38.34	62.11	+ 10.41	+ 0 4.21	17 1 54.85	+ 82 17 15.48	— 24.34	+72.57
— 0 0.01	— 0 27.30	333 47 16.99	. .	.41	0 0.60	17 27 50.30	+ 12 40 54.13	+ 8.10	—26.85
. . .	. . .	. . . .	. .	.37	0 0.52	21 57 56.12	. . . .	8.54	. .
. . .	. . .	. . . .	. .	.37	0 0.45	22 3 4.71	. . . .	. .	. .
. . .	. . .	. . . .	. .	.36	0 0.58	22 33 50.48	. . . .	8.19	. .
+ 0 0.02	2 26.83	290 40 38.15	. .	.36	0 0.37	22 49 11.54	— 30 25 44.71	9.53	+48.38
— 0 0.02	0 22.26	342 46 49.37	. .	.28	0 0.65	7 23 58.35	+ 21 40 26.51	. .	. .
—14 37.98	0 21.15	335 46 20.15	. .	.26	0 0.45	9 31 37.21	+ 14 39 57.29	. .	. .
+16 57.67	— 0 20.57								
. . .	. . .	. . . .	62.88	.22	+ 0 5.57	12 48 49.84	. . . .	10.35	. .
0 0.02	+ 1 32.33	52 37 8.45	. .						
0 0.01	1 20.15	6.11	. .						
0 0.00	1 12.90	6.72	. .						
0 0.00	1 10.69	7.57	. .	.22	— 0 19.77	13 4 54.16	+ 88 29 16.52	10.23	+79.79
0 0.00	1 13.41	7.46	. .						
0 0.01	1 21.01	7.47	. .						
+ 0 0.02	+ 1 33.86	5.96	. .						
— 0 36.23	— 1 2.48	310 44 53.39	. .	.21	— 0 16.15	13 17 7.04	— 10 21 29.24	10.55	—65.93
0 0.08	0 0.34	359 45 23.36	61.88	.15	+ 0 0.83	18 31 46 22	+ 38 39 0.73	5.14	—10.71
— 0 0.22	2 25.38	290 40 38.58	. .	.10	0 0.37	22 49 11.43	— 30 25 44.05	9.52	+48.42
+ 0 0.03	0 25.30	335 29 27.21	. .	.10	+ 0 0.61	22 57 9.41	+ 14 22 4.58	8.14	55.18
— 0 0.18	0 37.58	325 54 17.89	63.12	.09	— 0 10.39	23 31 5.60	+ 4 47 54.02	8.70	55.42
— 0 0.04	0 10.45	349 21 2.66	. .	.09	+ 0 0.72	0 0 30.02	+ 28 14 38.79	8.41	63.74
. . .	. . .	. . . .	. .	9.86	0 0.83	19 8 34.25	. . . .	4.95	. .
+ 0 0.18	0 40.06	323 55 26.60	61.28	.86	0 0.54	19 17 47.57	+ 2 49 4.57	8.48	7.42
+ 0 0.22	0 21.35	338 46 34.05	. .	.85	0 0.63	19 33 16.19	+ 17 40 12.02	7.22	9.39
— 0 0.16	0 30.03	331 21 17.06	. .	.85	0 0.58	19 38 59.73	+ 10 14 55.03	7.83	11.92
+ 0 0.02	0 35.50	327 8 19.40	. .	.84	0 0.56	19 47 48.46	+ 6 1 57.37	8.14	13.21
+ 0 0.12	— 0 8.76	350 58 14.71	. .	.84	0 0.73	20 23 9.95	+ 29 51 52.68	6.15	23.09
0 0.00	+ 0 5.64	5 50 40.48	. .	.83	0 0.91	20 36 14.68	+ 44 44 19.73	4.37	27.08
— 0 0.11	— 0 0.87	359 6 31.04	. .	.33	0 0.82	21 0 3.34	+ 38 0 9.25	6.63	+44.48
. . .	. . .	. . . .	. .	.32	0 0.45	22 2 30.17	. . . .	. .	. .
+ 0 0.26	+ 0 12.59	12 37 17.57	61.75	7.98	0 1.06	17 52 4.15	+ 51 30 55.07	3.24	—26.36
+ 0 0.13	— 1 36.94	300 0 52.11	. .	.98	0 0.42	18 4 37.19	— 21 5 30.39	10.52	— 7.19
— 0 0.16	1 22.70	307 17 16.49	. .	.91	0 0.45	22 1 21.75	— 13 49 6.01	. .	. .
. . .	. . .	. . . .	. .	.90	0 0.37	22 49 11.44	. . . .	9.44	. .
+ 0 0.05	0 25.86	335 29 22.01	. .	.89	0 0.61	22 57 9.31	+ 14 22 59.51	8.08	+54.20
+ 0 0.13	0 41.03	323 35 25.88	62.34	.32	0 0.52	19 17 47.61	+ 2 49 2.79	8.60	6.21
— 0 0.11	0 30.78	331 21 15.53	. .	.32	0 0.57	19 38 59.80	+ 10 14 52.44	7.94	10.18
+ 0 0.11	0 33.12	329 34 41.90	. .	.32	0 0.55	19 43 19.78	+ 8 28 18.85	8.17	12.96
0 0.01	— 0 36.41	327 8 18.00	. .	.32	0 0.54	19 47 48.66	+ 6 1 54.91	+ 8.23	11.73
+ 0 0.06	+ 1 3.28	49 57 38.96	. .						
— 0 2.95	1 5.47	38.14	. .						
0 4.70	1 6.47	37.39	. .						
0 6.28	1 6.76	36.10	. .	.32	0 33.50	20 16 57.32	+ 88 51 14.51	—234.79	19.20
— 0 3.60	1 5.63	37.65	. .						
+ 0 0.06	1 4.12	37.38	. .						
0 0.10	+ 0 33.85	30 39 51.50	. .	. .	. . .	. . . .	+ 69 53 28.41	— 2.16	38.39
0 0.06	— 0 32.16	330 17 4.68	. .	.32	0 0.56	21 36 41.11	+ 9 10 41.49	+ 7.95	39.00
+ 0 0.07	1 13.80	307 1 6.59	. .	.32	+ 0 3.27	21 58 28.85	— 14 5 16.50	. .	. .
— 0 20.19	1 13.80			. .	— 0 3.38				
0 0.00	— 0 31.08	331 8 31.60	. .	+ 7.32	+ 0 0.57	22 33 50.85	+ 10 2 8.51	+ 8.04	+48.98

NADIR POINTS.				
A.	B.	C.	D.	Means
	Aug.	12,	Night.	° ′
				179 59
60″0	61″0	65″0	62″3	62″08
60.0	60.8	64.6	61.8	61.80
60.0	61.0	65.0	62.0	62.00
61.0	62.0	64.6	62.0	62.40
60.4	62.0	64.7	62.0	62.27
60.28	61.36	64.78	62.02	62.11
	Aug.	13,	12*h*.	179 59
62.3	66.2	62.6	60.6	62.92
62.2	66.2	62.6	60.4	62.85
62.2	66.4	62.5	60.5	62.90
62.4	66.2	62.2	60.9	62.93
62.0	66.0	62.4	60.7	62.78
62.22	66.20	62.46	60.62	62.88
	Aug.	13,	18*h*.	179 59
61.4	65.2	60.8	60.1	61.88
61.5	65.0	61.1	60.2	61.95
61.4	65.3	60.9	60.1	61.92
61.1	65.2	61.0	60.0	61.82
61.3	65.2	60.9	60.0	61.85
61.34	65.18	60.94	60.08	61.88
	Aug.	13,	23.3*h*.	179 59
62.3	66.0	62.5	61.7	63.12
62.5	66.2	62.6	61.8	63.28
62.2	66.3	62.3	61.6	63.10
62.1	65.9	62.3	61.9	63.05
62.1	66.0	62.4	61.8	63.08
62.24	66.08	62.42	61.76	63.12
	Aug.	14,	Night.	179 59
59.8	59.0	63.9	62.0	61.18
60.0	59.2	63.9	62.0	61.27
60.0	59.2	64.2	61.8	61.42
60.0	59.1	64.0	62.0	61.28
60.1	59.0	63.9	62.0	61.25
59.98	59.20	63.98	61.95	61.28
	Aug.	18,	Night.	179 59
59.8	61.2	65.0	61.8	61.95
60.0	60.2	64.0	61.5	61.42
60.7	60.7	65.0	61.5	61.98
60.0	60.1	64.6	62.1	61.70
59.8	60.5	64.8	61.8	61.72
60.06	60.54	64.68	61.74	61.75
	Aug.	28,	19*h*.	179 59
61.9	65.2	63.0	59.4	62.38
61.8	65.2	62.6	59.9	62.37
61.9	65.2	62.0	59.4	62.38
61.8	65.2	62.5	59.8	62.32
61.7	65.2	62.3	59.8	62.23
61.82	65.20	62.68	59.66	62.34
	Aug.	28,	23*h*.	179 59
59.7	63.6	60.2	58.2	60.42
59.5	63.8	60.0	59.1	60.60
59.4	63.6	60.0	59.2	60.55
59.4	63.4	59.9	59.0	60.43
59.6	63.6	59.8	59.0	60.50
59.52	63.60	59.98	58.90	60.50

	Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
		m. s.	′ ″
4	Saturn .	+ 0 0.63	
7	Venus .	— 0 0.44	
8	Sun . .	. . . .	15 47.96
2	Saturn .	+ 0 0.63	
5	Saturn .	+ 0 0.63	

Aug. 12. Error of Runs, +0.11; Mic. coin., 40*r*106.
" 13. do. do. 0.63; " 40.099.
" 14. do. do. 0.61.
" 18. do. do. 0.72.
" 28. do. do. +0.46; " 40.098.

Aug. 24. Object glass taken out to remove moisture from the inside of the tube, and replaced. No change detected in the collimation.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THE At.
			s.	s.	s.	s.	s.	s.	s.	h. m. s.	° ′ ″	″	″	″	″	Revs.	In.	°
Aug. 28	1	α Piscis Aust.	25.5	39.0	51.1	4.0	16.5	29.3	42.0	22 49 3.91	290 42 58.6	61.0	65.8	62.1	61.88	. .	30.190	72.5
	2	α Pegasi	27.8	39.2	50.2	1.8	12.3	24.2	35.5	22 57 1.57	335 29 47.2	55.4	51.6	51.3	51.38	. .	30.190	72.6
	3	γ Cephei	39.8	28.0	15.2	3.5	51.0	39.0	26.5	23 33 3.29	37 52 18.4	12.0	14.4	13.6	14.60	. .	30.186	72.6
	†4	α Andromedæ . . .	45.0	57.2	10.0	22.2	34.8	47.1	59.2	0 0 22.21	349 21 14.6	18.7	18.1	15.2	16.65	. .	30.184	72.6
29	†5	α Ophiuchi	8.0	19.5	30.4	41.5	52.9	4.0	15.1	17 27 41.63	333 47 42.6	46.0	41.5	43.5	43.40	. .	30.062	76.4
	6	γ Draconis	2.0	20.0	37.2	54.9	12.5	30.0	47.4	17 52 54.86	12 37 12.0	8.0	10.9	9.6	10.12	. .	30.066	76.5
	7	μ^1 Sagittarii	53.2	5.4	16.9	28.5	40.3	52.0	3.5	18 4 28.54	300 2 30.5	32.1	34.5	32.2	32.32	. .	30.066	76.3
31	†8	Moon, 1st and S. L. (Mic. 2.)	17.4	29.8	41.2	53.4	5.2	17.4	29.5	18 19 53.41	301 36 24.8	32.1	34.3	31.9	30.78	36.403	30.128	81.0
	9		..	..	..	..	..	..	..		" " "	"	"	"	"	36.420		
	10	Moon, N. L. (Mic.6.)	..	..	..	..	..	..	..		" " "	"	"	"	"	42.290		
	11		..	..	..	..	..	..	..		" " "	"	"	"	"	42.312		
	†12		..	..	..	..	..	..	..		" " "	"	"	"	"	42.311		
	13	α Lyræ	54.0	8.3	22.0	36.0	50.5	4.4	18.2	18 31 36.20	359 45 26.8	29.4	29.1	26.2	27.88	. .		78.0
	†14	γ Aquilæ	16.5	28.1	39.0	50.1	1.1	12.0	23.3	19 38 50.01	331 21 48.3	54.0	52.0	51.0	51.32	. .	30.130	80.0
	15	α Aquilæ	36.8	48.0	59.0	10.0	21.2	32.2	43.1	19 43 10.06	329 35 15.7	19.5	20.8	18.9	18.72	. .		
	16	β Aquilæ	5.8	17.0	27.5	58.8	50.0	0.8	11.2	19 47 38.73	327 8 55.3	61.5	60.4	59.5	59.18	. .		
	17	λ Ursæ Minoris, (Mic.4)			21.0						49 56 42.3	34.8	40.4	40.3	39.42	. .	30.132	79.8
	18										" " "	"	"	"	"	40.045		
	19										" " "	"	"	"	"	39.980		
	†20					21.0				20 16 21.00	" " "	"	"	"	"	39.972	30.132	79.8
	21										" " "	"	"	"	"	39.993		
	22										" " "	"	"	"	"	40.133		
	23						25.0				42.3	34.7	40.3	40.3	39.40	. .	30.132	79.4
	24	α Cygni	18.6	34.0	49.1	4.8	19.9	35.6	50.8	20 36 4.69	5 50 43.4	42.5	42.0	44.7	43.15	. .	30.134	79.3
	25	61^1 Cygni	12.3	26.5	40.2	54.2	8.0	22.0	35.8	20 59 54.14	359 6 34.9	39.0	37.9	37.0	37.20	. .		
	†26	61^2 Cygni, (Mic. 4) . .	14.0	28.0	41.8	55.6	9.3	23.3	37.2	20 59 55.70	" " "	"	"	"	"	40.000	30.134	79.0
	27	α Cephei	37.8	2.0	24.5	48.0	11.2	34.3	58.0	21 14 47.97	23 2 31.4	26.4	30.6	30.3	29.68	. .	30.134	79.0
	28	β Aquarii	48.1	59.2	10.3	21.2	32.1	43.0	54.0	21 23 21.13	314 52 59.5	64.0	63.5	62.0	62.25	. .	30.132	79.0
	29	ε Pegasi	58.3	9.5	20.3	31.2	42.2	54.0	5.0	21 36 31.50	330 17 36.5	43.0	40.9	41.1	40.38	. .	30.132	78.7
	30	Saturn, 2d and N. L. .	55.0	6.2	17.1	28.8	40.0	51.5	2.2	21 57 28.69	306 58 48.5	51.5	53.8	53.8	51.90	. .	30.128	78.3
	31	Saturn, S. L. (Mic. 4).	..	..	..	..	..	..	..		" " "	"	"	"	"	39.480		
	32	ζ Pegasi	8.0	19.1	30.2	41.0	52.3	3.3	14.4	22 23 41.19	331 9 2.8	7.3	6.8	5.2	5.52	. .	30.132	78.0
	33	α Ursæ Majoris, S. P. .	12.5	48.8	25.2	1.2	37.3	14.0	50.3	22 54 1.33	78 27 23.5	20.0	24.0	20.5	22.00	. .	30.128	78.0
	34	ι Piscium	23.2	34.2	45.1	56.0	7.2	18.0	28.9	23 31 56.09	325 54 54.7	60.0	61.2	57.5	58.35	. .	30.118	77.3
	†35	Venus, 2d L.	19.8	31.4	42.7	54.2	5.7	17.4	28.9	8 59 54.30	. . . .	..	..	..	. .	. .		
Sept. 1	36	α^2 Capricorni	50.9	2.5	13.5	24.8	35.7	47.0	58.2	20 9 24.66	308 6 47.0	50.7	54.4	53.0	51.28	. .	30.132	79.5
	37	61^1 Cygni	12.0	26.1	40.0	54.0	8.0	22.0	35.8	20 59 53.99	359 6 36.7	38.1	38.2	38.6	37.90	. .	30.132	78.5
	38	ζ Cygni	38.2	52.0	4.5	16.9	29.5	42.0	54.9	21 6 16.86	350 42 53.5	55.5	51.5	50.8	52.82	. .	30.132	78.2
	39	β Aquarii	48.0	59.4	10.0	21.4	32.0	43.0	54.0	21 23 21.13	. . . .	..	..	..	. .	. .		
	40	β Cephei	58.0	30.1	1.4	33.7	5.3	37.3	8.8	21 26 33.51	30 59 26.1	18.0	23.2	22.3	22.40	. .	30.000	77.8
	41	ε Pegasi	58.3	9.5	20.5	31.5	42.5	53.5	4.9	21 36 31.53	330 17 35.4	41.0	44.5	40.5	40.35	. .	30.126	77.6
	†42	α Piscis Aust.	24.0	37.1	49.5	2.1	14.6	27.9	40.1	22 49 2.19	. . . .	..	..	..	. .	. .	30.126	72.6
	43	α Pegasi	26.0	37.5	48.5	0.0	11.2	22.5	33.7	22 57 59.91	335 29 52.0	57.0	54.8	54.0	54.45	. .	30.130	76.8
	44	γ Cephei	38.2	26.8	14.1	1.6	50.0	37.5	26.0	23 33 2.03	37 52 21.0	13.2	15.5	23.0	18.18	. .	30.120	76.4
	†45	α Andromedæ . . .	43.5	56.0	8.1	20.6	33.0	45.4	37.8	0 0 20.63	349 21 16.1	20.3	16.5	16.5	17.35	. .		76.8
2	46	α Lyræ	54.0	8.1	22.0	36.0	50.0	4.2	18.0	18 31 36.04	359 45 26.1	27.6	27.2	25.0	26.48	. .	30.096	81.2
	47	ζ Aquilæ	39.6	50.9	2.0	13.1	..	36.0	47.0	18 58 11.43	334 45 29.8	36.5	33.9	35.0	33.80	. .	30.104	81.1
	48	δ Aquilæ	4.8	16.0	26.4	37.9	48.8	59.9	10.6	19 17 37.77	323 56 5.7	12.4	10.4	8.9	9.35	. .	30.108	81.3
	49	γ Aquilæ	16.4	27.9	38.8	50.0	1.1	12.3	23.4	19 38 49.99	331 21 47.9	52.1	50.5	50.5	50.25	. .	30.104	81.0
	50	α Aquilæ	36.8	47.8	58.5	9.8	21.0	32.2	43.1	19 43 9.89	329 35 15.1	19.2	20.0	18.5	18.20	. .		
	51	β Aquilæ	5.7	16.2	27.8	34.8	49.6	0.7	11.8	19 47 38.66	327 8 55.6	61.5	60.2	59.5	59.20	. .	30.102	80.9
	†52	Moon, 1st & S.L. (Mic.1)	28.8	40.3	51.8	4.0	15.6	27.0	39.0	20 25 3.79	306 20 29.2	34.2	37.0	34.3	33.68	47.330	30.096	80.5

DATE.	VALUE OF m.	n.	c.	CLOCK. At 21h.	H. Rate. 0s.
	s.	s.	s.	s.	
Aug. 28	+0.273	+0.347	+0.230	s 7.323	l .000
29	.273	.347	.230	7.935	.010
31	.167	.294	.115	7.367	l .006
Sept. 1	.167	.294	.115	9.432	g .007
2	+0.167	+0.294	+0.115	s 9.409	g .021

4. Clouds.
5. Very steady.
8 to 12. Observed for declination of S. L. at 19*m*. 52*s*., and 20*m*. 4*s*.
" " N. L. at 20*m*. 15*s*., 20*m*. 26*s*., and 20*m*. 36*s*.
14. A slight haze in the sky. Stars well defined and very steady.
20. Hazy. Micrometer observations taken at 10*m*. 19*s*., 13*m*. 27*s*., 16*m*. 21*s*., 19*m*. 18*s* and 22*m*. 21*s*.
26. Micrometer reading recorded 40*r*.100.
35. Faint and very unsteady.
42, 45. Very unsteady.
52. Observed through a thick haze; sky nearly covered with clouds.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
− 0 0.16	− 2 27.90	290 40 33.82	62.34	+ 7.32	+ 0 0.34	22 49 11.57	− 30 25 49.27	+ 9.33	+49.46
+ 0 0.02	− 0 25.70	335 29 25.70	60.50	.32	0 0.60	22 57 9.49	+ 14 23 4.45	7.97	52.38
+ 0 0.18	+ 0 43.88	37 52 58.66	. .	.32	0 2.76	23 33 13.37	+ 76 46 37.41	0.13	66.84
− 0 0.04	− 0 10.62	349 21 5.99	. .	.32	0 0.72	0 0 30.25	+ 28 15 45.74	8.13	+60.10
+ 0 0.08	− 0 27.25	333 47 43.40	62.51	.89	0 0.59	17 27 50.11	+ 12 40 52.97	8.36	−28.24
0 0.38	+ 0 12.43	12 37 22.93	. .	.90	0 1.08	17 52 3.84	+ 51 30 59.67	3.57	27.86
+ 0 0.18	− 1 35.72	300 0 56.78	. .	.90	0 0.38	18 4 36.82	− 21 5 26.48	10.67	7.11
−16 44.74	+48 50.77	302 24 44.62	. .	9.37	0 0.39	18 21 14.20	− 18 41 38.64	. .	. .
−16 44.15	48 50.22		. .						
+15 44 05	48 37.53		. .						
15 44.89	48 37.02		. .						
+15 44.85	+48 36.61		. .						
− 0 0.07	− 0 0.24	359 45 27.57	. .	.36	0 0.48	18 31 46.04	+ 38 39 4.31	5.48	−13.82
− 0 0.12	0 30.32	331 21 20.88	63.76	.36	0 0.27	19 38 59.63	+ 10 14 56.37	7.97	+ 9.85
+ 0 0.10	0 32.58	329 34 46.24	. .	.36	0 0.26	19 43 19.68	+ 8 28 21.73	8.20	12.64
0 0.00	− 0 35.38	327 8 23.80	. .	.36	0 0.25	19 47 48.34	+ 6 1 59.29	+ 8.26	11.46
+ 0 0.40	+ 1 2.98	49 57 42.83	62.90	.36	0 21.96	20 16 52.32	+ 88 51 18.76	−232.71	18.32
− 0 1.87	1 4.46	42.04	. .						
0 3.31	1 5.68	41.82	. .						
0 3.58	1 6.13	42.00							
0 2.86	1 5.84	42.43	. .						
− 0 1.48	1 4.83	42.80	. .						
+ 0 0.40	1 3.11	42.96	. .						
+ 0 0.04	+ 0 5.69	5 50 48.88	. .	.36	0 0.57	20 36 14.62	+ 44 44 25.43	+ 4.52	22.29
− 0 0.09	− 0 0.87	359 6 36.24	. .	.37	0 0.49	21 0 4.00	+ 38 0 12.59	6.69	39.71
− 0 3.11	− 0 0.87	359 6 33.22	. .	.37	0 0.49	21 0 5.56	+ 38 0 9.57	6.69	39.71
+ 0 0.08	+ 0 23.68	23 2 53.44	. .	.37	0 0.92	21 14 58.26	+ 61 56 29.79	1.25	33.66
0 0.15	− 0 55.87	314 52 6.53	. .	.37	0 0.18	21 23 30.68	− 6 14 17.12	8.76	37.23
0 0.05	0 31.79	330 17 8.64	62.04	.37	0 0.27	21 36 41.14	+ 9 10 45.85	7.95	38.60
+ 0 0.17	1 13.24	306 56 28.37	. .	.37	0 0.13	21 57 37.56	− 14 9 54.43	. .	. .
− 0 20.74	1 13.25								
0 0.01	− 0 30.76	331 8 34.75	. .	.38	+ 0 0.27	22 33 50.84	+ 10 2 11.96	8.02	+48.53
0 0.05	+ 4 25.62	78 31 47.57	. .	.38	− 0 0.67	22 54 10.04	+ 62 34 35.22	15.53	−64.05
0 0.14	− 0 37.83	325 54 20.38	. .	.38	+ 0 0.24	23 32 5.71	+ 4 47 57.59	8.44	+53.03
. . .	. . .	. . . .	. .	.51	0 0.52	9 0 3.94	. . . .	. .	. .
0 0.06	1 10.93	308 5 40.23	62.05	.44	0 0.14	20 9 34.24	− 13 0 42.57	9.47	22.41
0 0.04	0 0.87	359 6 36.99	. .	.43	0 0.49	21 0 3.91	+ 38 0 14.19	6.69	39.46
− 0 0.06	− 0 9.13	350 42 43.63	. .	.43	0 0.41	21 6 26.70	+ 29 36 20.83	6.44	30 38
. . .	. . .	. . . .	. .	.43	0 0.17	21 23 30.73	. . . .	+ 8.76	. .
+ 0 0.04	+ 0 33.50	30 59 55.94	. .	.43	0 1.26	21 26 44.20	+ 69 53 33.14	− 2.08	36.99
0 0.02	− 0 31.95	330 17 8.42	. .	.43	0 0.27	21 36 41.23	+ 9 10 45.62	+ 7.95	38.49
. . .	. . .	. . . .	. .	.41	0 0.03	22 49 11.63	. . . .	9.29	. .
+ 0 0.01	− 0 25.55	335 29 28.91	. .	.41	0 0.30	22 57 9.62	+ 14 23 6.11	7.94	51.71
− 0 0.09	+ 0 43.56	37 53 1.65	. .	.41	0 1.92	23 33 13.36	+ 76 46 38.85	0.04	65.36
0 0.02	− 0 10.55	349 21 6.78	. .	.41	0 0.40	0 0 30.44	+ 28 14 43.98	8.07	+59.18
0 0.10	0 0.24	359 45 26.14	61.45	.45	0 0.48	18 31 45.97	+ 38 39 3.34	5.52	−14.08
− 0 0.14	0 26.01	334 45 7.65	. .	.45	0 2.16	18 58 23.04	+ 13 38 45.45	7.84	− 2.70
+ 0 0.20	0 40.20	323 55 29.35	. .	.44	0 0.23	19 17 47.44	+ 2 49 7.15	8.65	+ 5.88
− 0 0.20	0 30.14	331 21 19.91	. .	.43	0 0.27	19 38 59.69	+ 10 14 57.71	7.99	9.65
+ 0 0.17	0 32.40	329 34 45.97	. .	.43	0 0.26	19 43 19.58	+ 8 28 23.77	8.22	12.45
0 0.00	− 0 35.65	327 8 23.55	. .	+ 9.42	+ 0 0.25	19 47 48.33	+ 6 2 1.35	+ 8.28	+11.30
−16 22.04	+64 13.40	. . . .	. .						

NADIR POINTS. A.	B.	C.	D.	Means
	Aug.	29,	Night.	° ′ 179 59
61″0	61″4	65″9	63″6	62″98
61.0	61.0	65.0	62.0	62.22
61.6	62.0	64.5	62.1	62.40
60.3	61.5	65.0	62.6	62.35
61.0	62.0	65.0	62.4	62.60
60.86	61.58	65.08	62.54	62.51
	Aug.	31,	18*h*.	179 59
62.5	66.2	64.0	62.2	63.72
62.5	66.4	64.0	62.2	63.78
62.4	66.3	63.9	62.2	63.70
62.5	66.4	64.0	62.3	63.80
63.0	66.5	63.8	62.0	63.82
62.58	66.36	63.94	62.18	63.76
	Aug.	31,	23*h*.	179 59
61.0	64.5	61.8	60.9	62.05
61.2	64.7	61.7	60.7	62.08
61.0	64.5	61.9	60.8	62.05
61.1	64.4	61.7	60.9	62.02
61.0	64.6	61.7	60.8	62.02
61.06	64.54	61.76	60.82	62.04
	Sept. 1,	Night.		179 59
61.5	60.8	65.0	62.0	62.32
60.9	59.5	64.5	62.0	61.73
60.0	61.0	65.3	62.2	62.12
60.8	60.2	64.6	61.5	61.78
61.1	61.6	65.1	61.4	62.30
60.86	60.62	64.90	61.82	62.05
	Sept. 2.			179 59
61.0	64.5	60.4	59.9	61.45
60.9	64.9	60.2	60.3	61.57
60.8	64.5	60.5	59.7	61.38
60.8	64.5	60.1	60.0	61.35
60.6	64.8	60.6	59.8	61.45
60.82	64.64	60.36	59.94	61.45

).	Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
		m. s.	′ ″
0	Moon .	+ 1 11.03	16 7.83
0	Saturn .	− 0 0.63	0 10.46
5	Venus .	− 0 0.39	

Aug. 29. Error of Runs, +0″94.
" 31. do. do. 0.45; Mic. coincidence, 40r088.
Sept. 1. do. do. 0.22.
" 2. do. do. +0.72. " 40.088.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.			CIRCLE & MICROMETER READINGS. A.			B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.	Observers.
			s.	s.	s.	s.	s.	s.	s.	H.	M.	s.	°	′	″	″	″	″	″	Revs.	In.	°	°	
Sept. 2	†1	Moon, 1st and S. L. (Mic. 2)	28.8	40.3	51.8	4.0	15.6	27.0	39.0	20	25	3.79	306	20	29.2	34.2	37.0	34.3	33.68	47.350				H.
	2												"	"	"	"	"	"	"	47.406				
	3												"	"	"	"	"	"	"	47.460				
	4												"	"	"	"	"	"	"	47.512				
	†5												"	"	"	"	"	"	"	47.583				
	6	α Cygni	18.2	34.0	48.9	4.3	19.8	35.3	50.6	20	36	4.44	5	50	42.6	41.8	42.0	46.8	43.30	. .	30.098	80.3	78.4	
	7	61¹ Cygni	12.2	26.0	40.0	54.0	8.0	21.8	35.6	20	59	52.94	359	6	36.4	39.6	38.0	27.9	37.98	. .	30.100	80.0	77.8	
	8	61² Cygni	13.1	27.6	41.6	55.3	9.2	23.1	37.1	20	59	55.29	.	.	. .	..	..	..	..	. .				
	9	β Cephei	57.5	30.0	1.3	33.3	4.8	37.1	8.5	21	26	33.21	30	59	36.0	21.0	24.2	23.1	23.58	. .	30.104	80.0	77.5	
3	†10	Venus, 2d L.	7.6	19.0	30.6	42.0	53.5	5.0	16.3	9	14	42.00	.	.	. .	..	..	..	..	. .				M.
	11	α Leonis	28.5	39.6	50.8	1.9	13.0	24.5	35.6	10	0	1.99	.	.	. .	..	..	..	..	. .				
4	12	Sun, 1st L.	51.8	3.0	13.9	25.0	36.0	47.5	58.0	10	51	25.03	.	.	. .	..	..	..	..	. .				
	13	Sun, 2d L.	0.2	11.8	22.4	33.4	44.5	55.5	6.5	10	53	33.47	.	.	. .	..	..	..	..	. .				
	†14	Polaris, S. P.							37.0				.	.	. .	..	..	..	..	. .				
	15							28.5					.	.	. .	..	..	..	..	. .				
	16						29.4						.	.	. .	..	..	..	..	. .				
	17					22.0				13	5	21.92	.	.	. .	..	..	..	..	. .				
	18				18.0								.	.	. .	..	..	..	..	. .				
	19			9.0									.	.	. .	..	..	..	..	. .				
	†20		9.5										.	.	. .	..	..	..	..	. .				
	†21	η Bootis	38.5	50.0	1.8	13.2	24.6	36.5	47.8	13	47	13.20	.	.	. .	..	..	..	..	. .				
	22	Venus, 2d L.	2.5	14.2	25.4	36.9	48.2	59.9	11.2	9	19	36.90	.	.	. .	..	..	..	..	. .				
	†23	Mercury, 2d L.	20.9	32.1	43.0	54.2	..	..	..	9	54	37.55	332	32	56.0	59.0	64.1	55.7	58.70	. .	30.160	79.5	86.5	
5	24	Sun, 1st L.	29.0	40.0	51.1	2.4	13.4	24.4	35.4	10	55	2.24	.	.	. .	..	..	..	..	. .			87.4	
	†25	Sun, 2d and N. L.	37.8	49.1	0.0	11.1	22.0	33.0	44.1	10	57	11.01	328	10	29.4	32.4	36.5	29.0	31.82d	. .	30.167	85.0	88.7	
	26	Polaris, S. P.							34.0				52	35	33.8	25.0	36.2	29.6	31.15	. .	30.148	87.0	89.0	
	27							29.5							44.4	34.8	46.8	39.9	41.48	. .				
	28						27.0								53.0	42.6	53.0	48.0	49.15	. .				
	29					20.0				13	5	20.50			55.0	45.0	55.8	50.0	51.45	. .	30.144	87.1	89.0	
	30				17.0										50.5	40.8	51.5	45.2	47.00	. .				
	31			7.0											46.0	36.0	47.4	40.6	42.50	. .				
	32		9.0												..	..	..	..	..	. .	30.138	87.3	89.0	
	33	η Ursæ Majoris	28.0	45.4	2.1	19.4	36.1	53.4	10.4	13	41	19.26	11	11	18.1	11.2	21.4	15.7	16.60	. .	30.140	87.6	89.0	
	34	η Bootis	39.3	51.0	2.3	14.0	25.4	37.3	48.7	13	47	14.00	340	17	2.2	5.0	0.9	2.2	4.82	. .	30.138	87.8	89.0	
	35	α Bootis	56.4	8.2	19.4	31.3	43.0	54.5	6.3	14	8	31.30	341	5	53.9	56.4	61.0	55.1	56.60	. .	30.136	88.0	89.2	
	36	β Libræ	4.4	15.5	26.7	37.7	48.8	0.0	11.0	15	8	37.73	312	18	40.2	42.2	49.1	41.8	43.32	. .	30.140	88.3	88.6	
	37	α Coronæ Bor.	26.4	39.0	51.0	3.4	15.5	27.9	40.1	15	28	3.33	348	20	55.0	58.0	62.4	55.0	57.60	. .	30.140	88.3	88.3	
	38	α Serpentis	2.0	13.0	24.0	35.0	46.0	57.0	8.1	15	36	35.01	328	1	52.8	56.1	59.8	54.2	55.72	. .	30.140	88.3	87.8	
	39	ζ Ursæ Minoris	43.0	37.5	30.7	25.0	18.0	12.6	6.0	15	49	24.68	39	21	53.8	45.0	54.1	47.2	50.02	. .	30.140	88.3	86.8	
	40	δ Ophiuchi	38.0	49.0	0.0	11.1	22.0	33.1	43.7	16	6	10.99	317	49	42.0	44.0	48.7	45.5	45.05	. .		88.0	86.5	
	41	α Scorpii	17.0	29.4	41.4	53.5	5.7	17.9	30.0	16	19	53.56	295	3	9.6	10.8	21.0	10.8	13.05	. .	30.148	87.7	85.8	
	42	δ Aquilæ	6.2	17.2	28.3	39.3	50.1	1.2	12.0	19	17	39.19	323	56	7.3	12.2	17.5	10.2	11.80	. .	30.190	85.0	80.5	
	43	γ Aquilæ	18.0	29.2	40.3	51.5	2.5	13.6	24.7	19	38	51.40	331	21	47.3	53.1	56.0	50.2	51.65	. .	30.200	84.5	80.8	
	44	β Aquilæ	7.4	18.1	29.2	40.2	51.2	2.1	13.3	19	47	40.21	327	8	56.0	61.6	67.2	59.6	61.10	. .	30.200	84.3	85.0	
	†45	α² Capricorni	52.2	3.6	15.0	26.0	37.3	48.5	59.9	20	9	26.07	308	6	47.7	52.2	60.8	54.9	53.72	. .	30.210	84.0	79.6	
	†46	ζ Cygni	40.5	53.5	5.6	18.5	30.9	43.6	56.3	21	6	18.41	350	42	52.4	55.0	59.0	52.0	54.60	. .	30.220	82.7	78.6	
	47	β Aquarii	49.6	0.6	11.6	22.5	33.7	44.8	55.6	21	23	22.63	.	.	. .	..	..	..	..	. .				
	48	β Cephei	59.2	31.3	2.9	34.9	6.2	38.5	10.3	21	27	34.76	30	59	28.7	22.0	29.2	23.8	25.92	. .	30.220	82.3	79.1	
	49	Saturn, 1st and N. L.	32.0	43.4	54.3	6.0	17.0	28.5	40.0	21	56	5.89	306	50	22.8	25.0	31.1	23.8	25.68	. .	30.224	82.0	79.0	
	50	α Piscis Aust.	25.6	38.3	51.0	4.0	16.5	29.1	41.8	22	49	3.76	290	43	2.0	1.3	12.8	4.5	5.15	. .	30.232	82.0	78.3	
	51	γ Piscium	34.0	45.0	55.8	7.0	17.8	28.7	39.7	23	9	6.86	323	33	59.0	63.5	72.0	63.6	64.52	. .	30.232	82.0	77.6	
	52	Moon, 2d and N. L.	29.3	41.0	52.0	3.2	14.3	25.7	36.9	23	30	3.20	320	42	25.1	29.0	34.6	28.2	29.22	. .	30.232	82.0	77.5	

DATE.	VALUE OF m.	n.	c.	CLOCK. At 20h.		H. Rate. 0s.	
	s.	s.	s.		s.		
Sept. 4	+0.032	+0.462	+0.115	s	8.917	g	.016
5	+0.032	+0.462	+0.115	s	7.928	g	.031

1 to 5. Observed through a thick haze; sky nearly covered with clouds. Micrometer observations taken at 25*m*. 51*s*., 26*m*. 2*s*., 26*m*. 14*s*., 26*m*. 26*s*., 26*m*. 37*s*., and 26*m*. 48*s*.
10. Very unsteady at wires VI and VII.
14 to 20. Wind very high, and star very unsteady.
21. Very unsteady.
23. Very faint; entirely obscured after passing wire VI.
25. Clouds passing over.
45, 46. Observed through clouds.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h m. s.	° ′ ″	s.	″
−16 21.35	+64 11.83		. .						
16 19.44	64 9.12								
16 17.57	64 8.68	307 8 24.66	61.86	+ 9.42	+ 0 0.13	20 26 24.51	− 13 57 57.95	. .	. .
16 15.78	64 6.97		. .						
−16 13.35	64 5.40		. .						
+ 0 0.07	+ 0 5.65	5 50 49.02	. .	.42	0 0.57	20 36 14.43	+ 44 44 26.41	+ 4.54	+21.78
− 0 0.14	− 0 0.87	359 6 36.97	. .	.41	0 0.49	21 0 3.84	+ 38 0 13.95	6.70	39.20
0 0.00	0 0.00	. . . .	62.27	.41	0 0.49	21 0 5.19	. . . . .	+ 6.70	. .
+ 0 0.15	+ 0 33.10	30 59 56.83	. .	.40	0 1.30	21 26 43.91	+ 69 53 33.81	− 2.06	36.65
. . .	. . .	. . . .	. .	.09	0 0.29	9 14 50.99	. . . .	. .	. .
. . .	. . .	. . . .	. .	.07	0 0.25	10 0 11.31	. . . .	+ 11.40	. .
. . .	. . .	. . . .	. .	.06	0 0.21	10 52 38.52	. . . .	. .	. .
. . .	. . .	. . . .	. .	.06	+ 0 0.21				
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.03	− 0 21.86	13 5 9.09	. . . .	− 2.67	73.34
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.02	+ 0 0.31	13 47 22.53	. . . .	+ 10.03	. .
. . .	. . .	. . . .	63.69	8.26	0 0.24	9 19 45.01	. . . . .	. .	. .
0 0.00	− 0 19.16	332 32 39.54	. .	.24	0 16.98	9 55 2.48	+ 11 26 13.19	. .	. .
. . .	. . .	. . . .	. .	.21	0 0.21	10 56 15.04	+ 6 47 44.40	. .	. .
0 0.00	−16 22.98	327 54 8.84	. .	.21	+ 0 0.21				
− 0 0.02	+ 1 32.22	52 37 3.35	. .						
0 0.01	1 20.14	1.68	. .						
0 0.01	1 13.02	2.16	. .						
0 0.01	1 10.87	2.33	. .	.14	− 0 21.86	13 5 6.78	+ 88 29 22.14	− 3.04	+73.04
0 0.01	1 13.62	0.61	. .						
− 0 0.01	1 21.20	3.70	. .						
. . .	. . .	. . . .	. .						
+ 0 0.03	+ 0 10.73	11 11 27.36	. .	.12	+ 0 0.76	13 41 28.14	+ 50 5 2.92	+ 9.40	−75.12
+ 0 0.04	− 0 19.44	340 16 45.42	. .	.12	0 0.31	13 47 22.43	+ 19 10 20.98	10.04	72.33
0 0.00	0 18.57	341 5 38.03	. .	.11	0 0.32	14 8 39.73	+ 19 59 13.59	9.54	75.99
− 0 0.03	0 59.57	312 17 43.72	. .	.08	0 0.08	15 8 45.89	− 8 48 40.72	10.55	53.25
0 0.00	0 11.20	348 20 46.40	. .	.07	0 0.40	15 28 11.80	+ 27 14 21.96	8.58	59.81
+ 0 0.05	− 0 33.92	328 1 21.85	. .	.07	0 0.21	15 36 43.29	+ 6 54 57.38	+ 9.65	52.52
− 0 0.03	+ 0 45.61	39 22 35.60	. .	.06	0 2.82	15 49 35.56	+ 78 16 11.16	− 4.50	59.73
+ 0 0.06	− 0 49.33	317 48 55.78	. .	.06	+ 0 0.12	16 6 19.17	− 3 17 28.66	+ 10.03	43.56
− 0 0.01	1 56.12	295 1 16.92	. .	.04	− 0 0.07	16 20 1.53	− 26 5 7.52	11.53	−32.11
+ 0 0.04	0 40.19	323 55 31.65	. .	7.95	+ 0 0.17	19 17 47.31	+ 2 49 7.21	8.69	+ 5.70
− 0 0.03	0 30.16	331 21 21.46	. .	.94	0 0.24	19 38 59.58	+ 10 14 57.02	8.03	9.37
0 0.00	0 35.36	327 8 25.74	. .	.94	0 0.20	19 47 48.35	+ 6 2 1.30	8.31	11.07
0 0.04	1 10.40	308 5 43.28	. .	.93	0 0.04	20 9 34.04	− 13 0 41.16	9.50	22.28
− 0 0.04	− 0 9.07	350 42 45.49	. .	.89	0 0.42	21 6 26.72	+ 29 36 21.05	6.46	29.53
. . .	. . .	. . . .	. .	.89	0 0.10	21 23 30.62	. . . . .	+ 8.78	. .
+ 0 0.02	+ 0 33.20	30 59 59.23	. .	.88	0 1.63	21 27 44.27	+ 69 53 34.79	− 1.99	35.64
+ 0 0.03	− 1 22.25	306 49 3.43	. .	.87	+ 0 0.03	21 56 14.42	− 14 17 21.01	. .	. .
− 0 0.05	2 25.60	290 40 39.50	. .	.84	− 0 0.10	22 49 11.50	− 30 25 44.94	+ 9.27	50.23
+ 0 0.05	− 0 41.00	323 33 23.57	. .	.83	− 0 0.17	23 9 14.86	+ 2 26 59.13	+ 8.33	+58.64
− 0 0.02	+21 19.53	321 3 48.73	. .	+ 7.82	+ 0 0.15	23 29 1.95	− 0 2 35.71	. .	. .

NADIR POINTS.				
A.	B.	C.	D.	Means
	Sept.2,	22*h*.		° ′
				179 59
61″8	65″5	61″4	60″5	62″30
61.6	65.3	61.4	60.4	62.18
61.9	65.4	61.1	60.8	62.30
61.6	65.5	61.3	60.8	62.30
61.7	65.5	61.4	60.5	62.27
61.72	65.44	61.32	60.60	62.27
	Sept.5,	Night.		179 59
59.7	67.0	65.2	62.2	63.52
61.7	67.0	65.8	62.0	64.13
61.3	66.8	65.0	62.0	63.78
60.0	67.0	65.5	61.7	63.55
60.3	66.3	65.3	62.0	63.47
60.60	66.82	65.36	61.98	63.69

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Moon .	+ 1 11.17	
Venus .	− 0 0.39	
Venus .	− 0 0.39	
Mercury	− 0 0.29	
Saturn .	+ 0 0.63	
Moon .	− 1 9.22	

Sept. 4. Error of Runs, +0″32.
" 5. do. do. +0.13.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	TH
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°
Sept. 5	†1	α Andromedæ	45.0	57.8	9.5	22.3	34.5	47.1	59.5	0 0 22.24	349 21 20.0	21.0	26.0	18.8	21.45	. .	30.228	81.2
	2		50.0								49 34 67.8	49.8	70.0	63.9	65.38	. .	30.220	80.8
	3			50.6							55.1	47.0	55.1	51.5	52.18	. .		
	4				44.0						47.3	38.6	48.0	44.3	44.55	. .	30.220	80.7
	5	Polaris				39.7				1 4 39.19	45.0	37.3	46.3	42.0	42.65	. .		
	6						32.0				46.4	37.6	47.8	42.7	43.62	. .	30.220	80.7
	7							32.0			53.7	46.0	55.5	53.0	52.05	. .		
	8								26.0		64.6	55.0	66.6	60.0	61.80	. .	30.258	80.7
6	9	Mercury, 2d and S. L.	40.8	52.0	3.3	14.2	25.1	36.4	48.0	9 58 14.26	332 53 42.6	48.0	52.0	44.5	46.78	. .	30.258	83.5
7	10	Sun, 1st & N. L. (Mic.6)	44.1	55.1	6.2	17.1	28.2	39.2	50.5	11 2 17.20	327 11 11.0	18.0	22.8	11.6	15.85	40.096		
	11	Sun, 2d & S. L. (Mic.2)	52.3	3.5	14.7	25.8	36.8	47.6	58.7	11 4 25.63	“ “ “	“	“	“	“	35.335	30.228	84.8
	12	ε Pegasi	1.6	12.8	23.8	34.8	46.0	57.0	8.0	21 36 34.86	330 17 38.0	39.5	42.5	35.8	37.70	. .	30.112	78.1
	13	Saturn, 2d and N. L.	2.0	13.2	24.4	35.8	47.0	58.7	10.5	21 55 35.94	306 47 22.9	28.0	35.0	27.2	28.28	. .	30.100	77.8
	14	Saturn, S. L. (Mic.4)	..	..	..	..	..	..	..	. . . .	“ “ “	“	“	“	“	39.481		
	15	ζ Pegasi	11.1	22.2	33.0	44.8	55.5	7.0	18.0	22 33 44.51	331 9 2.4	4.8	9.5	3.5	5.05	. .	30.092	77.0
	16	α Piscis Aust. (Mic.4)	27.5	40.1	52.5	5.8	18.0	31.5	44.0	22 49 5.63	290 40 27.0	28.6	36.3	29.6	30.38d	44.400	30.092	76.8
	17	α Ursæ Majoris, S. P.	..	..	..	50.0	..	..	..	22 54 5.00	78 27 20.0	14.5	23.7	16.1	18.58	. .		
	18	α Pegasi	29.2	41.0	51.0	3.2	14.8	26.0	37.0	22 57 3.17	335 29 51.3	58.2	60.2	54.3	56.00	. .	30.094	76.7
	19	γ Cephei	42.0	30.2	17.0	5.5	..	41.0	29.0	23 32 57.45	37 52 18.8	11.7	21.4	15.4	16.82	. .	30.098	76.5
8	20	α Aquilæ	40.6	51.9	3.0	14.0	25.0	36.1	47.1	19 43 13.96	329 35 15.7	17.6	22.5	18.0	18.70	. .	29.908	81.5
	21	β Aquilæ	9.5	21.0	31.5	42.7	53.2	4.8	16.0	19 47 42.67	327 8 54.5	58.6	63.5	60.0	59.15	. .	29.908	81.2
	†22	α² Capricorni	55.0	6.4	17.2	28.5	39.6	51.0	2.4	20 9 28.59	308 6 43.0	48.5	56.0	53.8	50.32	. .	29.900	81.1
	23	61¹ Cygni	16.5	30.5	44.4	58.0	11.8	26.0	39.9	20 59 58.17	359 6 34.8	36.7	40.0	36.7	37.05	. .	29.912	81.2
	24	ζ Cygni	43.3	56.0	8.6	21.0	33.5	46.2	58.9	21 6 21.07	350 42 52.6	55.6	59.5	56.3	56.00	. .	29.912	81.2
	25	β Aquarii	52.1	3.5	14.3	25.4	36.2	47.3	58.2	21 23 25.29	. . . .	..	..	..	. .	. .	29.912	80.0
	26	β Cephei	1.7	34.1	6.0	37.7	9.2	41.8	13.1	21 26 37.66	30 59 30.2	23.2	30.2	26.2	27.45	. .	29.904	80.0
	†27	ε Pegasi	2.4	13.5	24.2	35.2	46.5	58.0	9.0	21 36 35.54	330 17 36.0	41.3	44.0	42.2	40.87	. .	29.904	79.7
	28	Saturn, 1st and N. L.	46.5	58.0	9.0	20.3	31.5	43.0	54.1	21 55 20.34	306 46 0.5	5.2	13.5	6.2	6.35	. .	29.916	79.3
	29	α Piscis Aust.	28.5	41.0	53.6	6.3	19.0	31.9	44.3	22 49 6.37	290 42 54.0	55.2	64.7	58.2	58.02	. .	29.910	78.9
	†30	γ Cephei	44.0	31.8	18.7	7.0	54.4	42.2	30.1	23 33 6.89	37 52 25.8	18.5	26.8	22.5	23.40	. .	29.904	78.2
	31	α Andromedæ	47.6	0.3	12.6	25.0	37.2	50.0	2.4	0 0 25.01	349 21 18.0	22.0	25.0	20.3	21.32	. .	29.914	78.0
	32	γ Pegasi	43.5	54.8	6.0	17.3	28.5	39.8	51.0	0 5 17.27	335 26 48.0	50.0	53.0	52.6	50.90	. .		79.9
	33	α Cassiopeiæ	49.7	9.2	28.5	47.7	7.0	26.7	46.0	0 31 47.83	16 47 55.8	50.0	57.0	53.4	54.05	. .	29.912	77.4
	34		54.0								49 35 8.7	0.4	9.5	6.3	6.22	. .	29.912	77.3
	35			57.0							34 55.0	55.3	55.3	52.3	54.48	. .		
	36				50.5						45.8	37.8	47.2	44.3	43.78	. .	29.910	77.0
	37	Polaris				44.0				1 4 43.79	45.6	37.2	46.7	44.0	43.38	. .		
	38						35.5				46.3	37.0	47.1	44.5	43.72	. .	29.910	77.0
	39							34.5			53.5	44.4	53.2	51.0	50.52	. .		
	40								31.0		65.6	56.8	66.5	62.5	62.85	. .	29.910	77.0
9	41	α Cygni	23.1	39.0	54.1	9.0	25.0	40.6	56.0	20 36 9.54	5 50 45.0	42.9	48.9	46.5	45.82	. .		
	42	61¹ Cygni	17.5	31.3	45.0	59.1	13.0	27.0	40.8	20 59 59.10	359 6 37.3	41.0	45.2	39.9	40.85	. .	30.242	70.0
	43	61² Cygni, (Mic.4)	19.0	33.0	46.6	0.6	14.5	28.3	42.0	21 0 0.57	“ “ “	“	“	“	“	39.980		
	44	α Cephei	43.0	6.8	29.4	53.0	16.1	39.5	2.5	21 14 52.90	23 2 34.6	28.6	37.5	33.0	33.42	. .	30.248	70.0
	45	β Aquarii	53.3	4.1	15.2	26.2	37.1	48.2	59.2	21 23 26.19	314 53 1.0	5.6	12.0	3.8	5.60	. .	30.246	69.8
	46	ε Pegasi	3.1	14.2	25.5	36.5	47.6	59.0	9.8	21 36 36.53	330 17 39.4	45.7	48.1	43.7	44.23	. .	30.248	68.6
	47	γ Cephei	..	32.0	19.5	8.0	55.5	43.3	..	23 33 7.66	37 52 52.4	17.6	25.5	20.5	21.75	. .	30.278	69.0
13	48	α Lyræ	0.0	14.3	28.1	42.1	56.0	10.4	24.1	18 31 42.14	359 45 26.1	28.0	32.5	26.2	28.20	. .	30.032	79.1
	49	δ Aquilæ	11.1	22.1	33.0	44.0	55.0	6.0	17.0	19 17 44.03	323 56 4.8	10.4	12.8	8.6	9.15	. .	30.038	78.8
	50	β Ceti	17.4	28.8	40.5	52.0	3.5	15.2	26.6	0 35 52.00	. . . .	..	..	..	. .	. .		
	51		53.3								49 35 7.8	0.5	10.0	4.8	5.78	. .	30.008	75.3
	52	Polaris		58.0							34 56.3	48.0	57.0	41.8	53.28	. .		

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 22h.	0s.
	s.	s.	s.	s.	
Sept. 7	−0.356	+0.527	+0.022	s 5.623	g .030
8	.356	.527	.022	5.841	.028
9	.356	.527	.022	4.777	.021
13	−0.356	+0.527	+0.022	s 3.439	g .020

1. Very unsteady.
22. Wind very high, and star unsteady.
27. Very unsteady. Poor observation.
30. Unsteady.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
— 0 0.01	— 0 10.45	349 21 10.99	63.69	+ 7.81	+ 0 0.41	0 0 30.46	+ 28 14 46.55	+ 8.03	+58.27
+ 0 0.28	+ 0 42.50	49 35 48.16	. .						
0 0.35	9 54.99	47.52	. .						
0 0.38	1 2.57	47.50	. .						
0 0.39	1 5.21	48.25	. .	.77	+ 0 21.84	1 5 8.80	+ 88 29 23.02	— 3.24	72.88
0 0.38	1 2.98	46.98	. .						
0 0.35	0 55.74	48.14	. .						
0 0.30	+ 0 43.58	45.68	. .						
0 0.05	— 0 19.51	332 53 27.32	63.30	6.98	— 0 0.24	9 58 20.73	+ 11 47 3.27	. .	. .
+14 28.43	0 30.26	327 9 19.01	. .	.95	0 0.28	11 3 28.08	+ 6 2 54.96	. .	. .
—17 21.75	0 30.10		. .	.95	0 0.28				
+ 0 0.09	0 31.88	330 17 5.91	61.23	.64	0 0.25	21 36 41.25	+ 9 10 43.93	+ 7.97	37.75
— 0 0.11	1 13.90	306 46 3.68	. .	.62	0 0.47	21 55 41.46	— 14 20 18.30	. .	. .
0 21.28	1 13.91								
— 0 0.02	0 30.77	331 8 34.26	. .	.61	0 0.24	22 33 50.88	+ 10 2 12.28	8.00	47.60
+ 2 28.06	— 2 26.56	290 40 31.88	. .	.60	0 0.64	22 49 11.59	— 30 25 50.10	9.26	+50.44
— 0 0.06	+ 4 27.36	78 31 45.88	. .	.60	0 1.42	. . .	+ 62 34 36.09	15.48	—61.83
+ 0 0.01	— 0 25.51	335 29 30.50	. .	.60	— 0 0.20	22 57 9.57	+ 14 23 8.52	+ 7.91	+50.77
— 0 0.27	+ 0 43.55	37 53 0.10	. .	.58	+ 0 9.91	23 33 13.94	+ 76 46 38.12	— 0.09	63.18
+ 0 0.11	— 0 32.24	329 34 46.57	63.24	5.90	— 0 0.35	19 43 19.51	+ 8 28 22.58	+ 8.29	11.95
0 0.00	0 35.48	327 8 23.67	. .	.90	0 0.28	19 47 48.29	+ 6 1 59.68	8.35	10.86
— 0 0.13	1 9.91	308 5 40.28	. .	.88	— 0 0.47	20 9 34.00	— 13 0 43.71	9.54	22.43
0 0.09	0 0.87	359 6 36.09	. .	.86	+ 0 0.08	20 59 4.11	+ 38 0 12.10	6.76	37.64
— 0 0.14	— 0 8.93	350 42 46.93	. .	.86	— 0 0.03	21 6 26.90	+ 29 36 22.94	6.49	28.93
. . .	. . .	. . . .	. .	.86	— 0 0.39	21 23 30.76	. . . .	+ 8.79	. .
+ 0 0.09	+ 0 33.13	31 0 0.67	. .	.85	+ 0 1.14	21 26 44.65	+ 69 53 36.68	— 1.91	34.65
+ 0 0.05	— 0 31.46	330 17 9.46	. .	.85	— 0 0.25	21 36 41.14	+ 9 10 45.47	+ 7.97	37.64
— 0 0.17	1 22.03	306 44 44.15	. .	.86	0 0.47	21 55 26.36	— 14 21 39.84	. .	. .
0 0.15	— 2 24.42	290 40 33.45	. .	.82	— 0 0.64	22 49 11.55	— 30 25 50.54	9.26	50.56
0 0.21	+ 0 42.97	37 53 6.16	. .	.80	+ 0 1.98	23 33 14.67	+ 76 46 42.17	0.12	62.80
— 0 0.05	— 0 10.41	349 21 10.86	. .	.79	— 0 0.04	0 0 30.76	+ 28 14 46.87	7.99	57.61
+ 0 0.02	— 0 25.29	335 26 25.63	. .	.79	— 0 0.20	0 5 22.86	+ 14 20 1.64	8.24	56.48
0 0.02	+ 0 16.72	16 48 10.79	. .	.78	+ 0 0.44	0 31 54.05	+ 55 41 46.80	+ 7.69	64.61
0 0.28	0 42.44	49 35 48.94	. .						
0 0.34	0 54.84	49.66	. .						
0 0.38	1 2.41	46.57	. .						
0 0.38	1 5.04	48.80	. .	.76	0 20.47	1 5 10.02	+ 88 29 23.67	— 4.65	71.98
0 0.38	1 2.77	46.87	. .						
0 0.36	0 55.51	46.39	. .						
0 0.29	0 43.25	46.39	. .						
+ 0 0.06	+ 0 5.84	5 50 51.72	. .	4.81	0 0.20	20 36 14.55	+ 44 44 26.38	+ 4.65	20.09
— 0 0.15	— 0 0.87	359 6 39.83	64.59	.80	0 0.08	21 0 3.99	+ 38 0 14.49	6.77	37.50
— 0 4.23	— 0 0.87	359 6 35.75	. .	.80	0 0.08	21 0 5.48	+ 38 0 10.41	6.77	37.50
+ 0 0.12	+ 0 24.29	23 2 57.83	. .	.80	+ 0 0.60	21 14 58.36	+ 61 56 32.49	1.42	30.83
+ 0 0.22	— 0 57.30	314 52 8.52	. .	.79	— 0 0.39	21 23 30.59	— 6 14 16.82	8.79	36.94
+ 0 0.05	— 0 32.60	330 17 11.68	. .	.79	— 0 0.25	21 36 41.07	+ 9 10 46.34	+ 7.97	37.53
— 0 0.34	+ 0 44.67	37 53 6.08	. .	.75	+ 0 1.62	23 33 14.03	+ 76 46 40.74	— 0.09	+62.38
— 0 0.09	— 0 0.24	359 45 27.87	62.61	3.51	+ 0 0.09	18 31 45.74	+ 38 39 4.51	+ 5.79	—15.25
+ 0 0.16	— 0 41.38	323 55 27.93	. .	.49	— 0 0.31	19 17 47.21	+ 2 49 4.57	8.81	+ 5.31
. . .	. . .	. . . . .	. .	+ 3.39	— 0 0.52	0 35 54.87	. . . .	+ 8.32	. .
0 0.28	+ 0 42.25	49 35 48.31	. .						
+ 0 0.35	+ 0 55.15	48.78	. .						

NADIR POINTS.				
A.	B.	C.	D.	Means
	Sept.6	10.3*h.*		° ′ 179 59
62″0	65″4	65″8	59″7	63″22
62.5	65.3	66.0	59.7	63.22
62.4	65.2	65.8	59.7	63.27
62.2	65.3	65.8	60.0	63.33
62.0	65.3	66.1	59.8	63.30
62.22	65.30	65.90	59.78	63.30
	Sept.7	23.3*h.*		179 59
59.5	62.8	64.1	58.2	61.15
59.6	62.8	64.3	58.3	61.25
59.5	62.5	64.0	58.4	61.20
59.8	63.0	64.0	58.1	61.23
59.6	63.1	64.3	58.2	61.30
59.60	62.92	64.14	58.24	61.23
	Sept.8	Night.		179 59
62.0	65.0	64.0	62.7	63.42
61.4	66.0	64.7	62.6	63.68
62.0	65.6	64.7	62.0	63.57
61.0	65.2	64.7	61.7	63.15
60.5	65.2	64.0	61.3	62.75
60.4	65.2	64.2	61.6	62.85
61.22	65.39	64.38	61.98	63.24
	Sept. 9			179 59
62.5	66.0	67.4	62.0	64.48
62.6	66.0	67.6	62.0	64.55
62.4	66.0	67.9	62.5	64.82
62.2	66.2	67.5	62.2	64.52
62.3	66.3	67.5	62.2	64.58
62.50	66.10	67.58	62.18	64.59
	Sep. 13	Night.		179 59
58.9	63.0	64.5	62.0	62.10
59.4	64.1	65.1	62.3	62.72
59.3	64.3	64.6	62.1	62.58
59.3	65.5	64.7	62.0	62.57
59.5	65.6	64.7	61.3	62.78
59.28	64.50	64.72	61.94	62.61
	Sep. 13	9.7*h.*		179 59
62.6	66.5	66.8	59.6	63.80
62.4	66.0	66.9	59.5	63.70
62.4	66.7	67.0	59.5	63.90
62.4	66.5	67.1	59.4	63.85
62.3	66.2	66.7	59.2	63.60
62.42	66.38	66.90	59.44	63.78

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Mercury .	— 0 0.27	
Sun . .	. . .	15 55.01
Saturn .	— 0 0.63	0 10.59

Sept. 7. Error of Runs, +0″62; Mic. coincidence, 40*r*096.
" 8. do. do. 0.46.
" 9. do. do. 0.77; do. 40.098.
" 13. do. do. +0.57; do. 40.105.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.		OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	TH
				I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.
				s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°
Sept. 16	†1		Polaris, (Mic. 4) .									49 34 37.6	32.7	41.4	36.4	37.02d	40.580		
	†2									35.0		" " "	"	"	"	"	40.783	30.090	58.
	†3	α	Ceti	..	54.0	5.2	16.3	27.2	38.1	49.2	2 54 21.67	324 36 10.1	15.8	22.8	14.4	15.78	. .	30.080	57.
19	4	μ^1	Sagittarii	1.9	13.6	25.0	36.9	48.7	0.5	12.0	18 4 36.94	300 2 29.1	31.5	39.0	33.6	33.30	. .	30.194	73.
	5	δ	Ursæ Minoris . . .	..	..	..	39.0	..	..	..	18 21 39.00	. . . .	..	..	..	. .	. .		
	6	51	(Hev.) Cephei, S. P. .	..	..	..	0.0	..	..	..	18 27 0.00	. . . .	..	..	..	. .	. .		
	7	α	Lyræ	3.7	17.8	31.5	45.9	59.7	13.8	27.7	18 31 45.73	359 45 28.6	30.5	35.0	30.5	31.15	. .	30.194	72.
20	†8	α	Leonis	..	..	..	12.2	23.3	34.2	45.3	10 0 28.75	333 49 40.2	44.6	48.6	41.5	43.72	. .	30.126	69.
	†9		Venus, 2d & N. L. .	49.5	2.0	12.2	23.3	34.1	46.0	57.0	10 36 23.44	331 13 54.0	59.6	62.1	55.1	57.70	. .	30.126	70.
	10		Venus, S. L. (Mic.4).	..	..	..	..	..	..	..	. . . .	" " "	"	"	"	"	39.750		
	11		Mercury	42.2	53.1	4.2	15.0	26.0	37.1	48.2	11 8 15.16	328 37 11.5	15.9	24.0	12.5	15.98	. .	30.126	71.
21	†12		Sun, 1st & S. L. (Mic. 2)	10.8	..	32.8	43.9	54.4	5.2	16.2	11 52 47.12	321 46 10.5	12.5	22.4	13.0	14.58	40.100		
	†13		Sun, 2d & N. L. (Mic. 6)	19.0	29.5	40.8	51.6	2.8	13.5	..	11 54 46.20	" " "	"	"	"	"	44.920	30.126	73.
	14									43.0		52 35 32.6	25.9	37.3	29.1	31.22	41.605	30.114	74.
	15											" " "	"	"	"	"	41.854		
	16								35.0			" " "	"	"	"	"	42.018		
	17											" " "	"	"	"	"	42.125		
	18											" " "	"	"	"	"	42.231		
	19		Polaris, S. P. (Mic.4)				29.0				13 6 38.83	" " "	"	"	"	"	42.251	30.110	75.
	†20											" " "	"	"	"	"	42.230		
	21					25.0						" " "	"	"	"	"	42.178		
	22											" " "	"	"	"	"	42.065		
	23				18.0							" " "	"	"	"	"	41.950		
	24											" " "	"	"	"	"	41.752		
	25			23.0								" " 34.4	26.7	38.4	30.6	32.52	41.526	30.106	76.
	26	ζ	Aquilæ	49.6	1.2	12.1	23.7	34.6	46.1	57.2	18 58 23.50	334 45 29.7	36.0	39.8	33.5	34.75	. .	30.100	75.
	27	ζ	Pegasi	18.2	29.6	40.1	52.0	3.0	14.0	25.2	22 33 51.73	331 9 7.3	10.2	18.8	9.0	11.32	. .	30.138	69.
	†28	α	Leonis	39.0	50.2	1.4	12.8	23.6	34.8	46.2	10 0 12.57	. . . .	..	..	..	. .	. .		
	†29		Venus, 2d and S. L. .	31.8	43.1	54.1	5.3	16.4	27.7	38.6	10 41 5.29	330 47 28.1	28.8	34.5	26.8	29.55	. .	30.244	67.
	†30	α	Ursæ Majoris . . .	59.6	23.4	46.8	10.5	34.3	58.7	22.0	10 54 10.76	23 40 33.4	27.3	36.5	29.6	31.70d	. .	30.244	67.
	†31		Mercury, 2d and S. L.	18.6	29.8	40.6	51.7	2.9	14.0	25.2	11 14 51.83	327 57 55.8	59.5	65.5	59.6	60.10	. .	30.240	67.
22	32		Sun, 2d & N. L. . . .	54.9	6.6	17.0	27.9	38.7	49.7	0.6	11 58 27.83	321 40 5.2	7.7	18.0	9.0	9.98	. .	30.240	68.
	33	β	Ceti	22.0	33.5	45.0	56.4	8.5	20.0	31.4	0 35 56.69	. . . .	..	..	..	. .	. .		
	†34			3.5								49 35 12.2	3.7	17.6	8.7	10.55	. .	30.220	62.
	35				6.5							34 58.8	49.8	61.5	55.0	56.28	. .		
	36					57.5						50.0	41.0	52.5	48.0	47.88	. .	30.208	62.
	37		Polaris				54.5				1 4 53.50	46.0	37.0	48.5	44.0	43.88	. .		
	38							48.0				46.2	38.8	49.2	45.0	44.80	. .		
	39								45.5			34 58.6	40.8	60.5	55.0	53.72	. .		
	†40									39.0		35 9.0	1.0	14.5	6.0	7.62	. .	30.208	62.
	†41		Venus, 2d and N. L. .	12.9	24.0	35.1	46.2	57.2	8.2	19.5	10 45 46.16	330 21 6.3	10.7	16.0	6.7	9.92	. .	30.236	67.
	42		Venus, S. L. (Mic.4).	..	..	..	..	..	..	..	. . . .	" " "	"	"	"	"	39.737	"	"
	†43		Mercury, 2d and S. L.	57.1	8.8	19.2	30.8	41.2	53.0	3.4	11 21 30.50	327 16 29.7	34.3	40.3	31.7	34.00d	41.361	30.228	68.
	44		Mercury, N. L. (Mic.4)	..	..	..	..	..	..	..	. . . .	" " "	"	"	"	"	41.480	"	"
23	45		Sun, 1st & S. L. (Mic.2)	23.1	34.0	45.0	56.1	7.0	18.0	29.1	11 59 56.04	320 59 21.3	27.0	33.5	24.2	26.50	40.110		
	46		Sun, 2d & N. L. (Mic.6)	31.1	42.1	53.0	4.1	15.0	26.2	37.0	12 2 4.07	" " "	"	"	"	"	45.045	30.216	70.
	†47									46.0		52 35 32.0	25.8	37.0	27.7	30.62	41.556	30.204	71.
	48											" " "	"	"	"	"	41.818		
	49								39.0			" " "	"	"	"	"	41.971		
	50											" " "	"	"	"	"	42.146		
	51							39.0				" " "	"	"	"	"	42.156		
	†52		Polaris, S. P. (Mic.4)									" " "	"	"	"	"	42.223		

DATE.	VALUE OF			CLOCK.		H. Rate.
	m.	n.	c.	At 18h.		0s.
	s.	s.	s.		s.	
Sept. 19	−0.415	+0.429	+0.022	s	0.030	g .019
21	0.415	0.429	0.022	f	0.419	.020
22	0.415	0.429	0.022		0.888	.014
23	−0.415	+0.429	+0.022		1.513	.011

1, 2. Micrometer observations taken at times of transit, and also while the star appeared
the transit wires at 22*m.* 10*s.*

3, 30. Exceedingly unsteady. 8, 28. Tremulous and faint.

9. Correction for defective illumination of N. L. +0″.13.

12, 13. Observed through clouds.

20. Faint and tremulous. Micrometer observations taken at 44*m.* 57*s.*, 48*m.* 54*s.*, 5
55*m.* 25*s.*, 1*m.* 59*s.*, 5*m.* 36*s.*, 9*m.* 5*s.*, 12*m.* 34*s.*, 15*m.* 58*s.*, 19*m.* 25*s.*, 22*m.* 52*s.*, and

29. Very unsteady and badly defined. Correction for defective illumination of N. L. -

31. Badly defined, and very unsteady.

34 to 40. Very unsteady. Observations not good.

41. Tremulous. Correction for defective illumination of N. L. +0″.12.

43. Quite steady. Correction for defective illumination of N. L. +0.″12.

47 to 52. Very tremulous. Difficult to set the mic. wire on the star. Micrometer obs
taken at 44*m.* 46*s.*, 48*m.* 37*s.*, 51*m.* 39*s.*, 55*m.* 30*s.*, 58*m.* 39*s.*, and 2*m.* 8*s.*

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 16.19	+ 0 53.35	49 35 46.56	62.56	+ 1.54	+ 0 20.47	1 5 7.87	+ 88 29 23.54	. .	. .
0 23.17	+ 0 46.69	46.88	. .						
+ 0 0.01	— 0 41.49	324 35 34.30	. .	.49	— 0 5.79	2 54 17.37	+ 3 29 10.99	+ 8.90	+42.86
— 0 0.23	1 37.28	300 0 55.79	62.05	+ 0.03	— 0 0.56	18 4 36.41	— 21 5 27.01	+ 10.96	— 6.84
. . .	. . .	. . . . .	. .	.02	+ 0 6.74	18 21 45.78	. . . . .	— 63.99	. .
. . .	. . .	. . . . .	. .	.02	— 0 9.26	18 26 50.76	. . . . .	+101.52	. .
0 0.02	0 0.24	359 45 30.89	. .	.02	0 0.04	18 31 45.71	+ 38 39 8.09	5.94	15.67
0 0.26	0 24.41	333 49 16.05	64.35	— 0.25	0 17.12	10 0 11.38	+ 12 42 50.95	+ 11.17	—56.14
0 0.19	0 27.72	331 13 23.47	. .	.26	0 0.31	10 36 22.50	+ 10 6 58.37	. .	. .
— 0 12.54	0 27.98	. .							
+ 0 0.22	0 30.22	328 36 46.01	. .	.28	0 0.33	11 8 14.55	+ 7 30 20.91	. .	. .
—14 37.68	0 38.63	321 46 54.62	. .	.30	— 0 4.02	11 53 46.89	+ 0 40 29.52	. .	. .
+17 14.23	— 0 37.84		. .	.30	+ 0 5.08				
0 51.77	+ 1 32.92	52 36 56.56	. .						
1 0.34	1 25.69	57.90	. .						
1 5.98	1 21.31	59.16	. .						
1 9.67	1 16.90	58.44	. .						
1 13.31	1 12.38	57.56	. .						
1 14.00	1 11.86	57.73	. .	.32	— 1 26.41	1 5 12.10	+ 88 29 27.49	— 9.27	+67.59
1 13.27	1 12.62	57.76	. .						
1 11.49	1 14.65	.58.01	. .						
1 7.60	1 17.80	57.27	. .						
1 3.65	1 22.36	57.88	. .						
0 56.83	1 28.14	56.84	. .						
+ 0 49.05	+ 1 35.34	56.26	. .						
— 0 0.06	— 0 26.44	334 45 8.25	63.12	.44	0 0.29	18 58 22.77	+ 13 38 44.38	+ 8.16	— 3.93
— 0 0.03	0 31.30	331 8 39.99	. .	.51	0 0.31	22 33 50.91	+ 10 2 16.12	8.01	+46.08
. . .	. . .	. . . . .	64.42	.58	0 0.29	10 0 11.70	. . . .	11.16	. .
+ 0 0.06	— 0 23.78	330 47 5.73	. .	.58	— 0 0.32	10 41 4.02	+ 9 40 40.56	. .	. .
0 0.00	+ 0 24.89	23 40 56.59	. .	.59	+ 0 0.46	10 54 10.63	+ 62 34 31.42	15.27	—57.12
. . .	. . .	. . . . .	. .	.60	— 0 0.33	11 14 50.72	. . . .	. .	. .
. . .	. . .	. . . . .	. .	.61	0 0.39	11 57 22.79	. . . .	. .	. .
. . .	. . .	. . . . .	. .	.78	— 0 0.54	. . .	. . . .	+ 8.23	. .
0 0.08	0 45.35	49 35 55.98	. .						
0 0.10	0 58.11	54.49	. .						
0 0.11	1 5.67	53.66	. .						
0 0.12	1 8.33	52.33	63.55	.79	+ 0 16.72	1 5 9.43	+ 88 29 29.23	— 9.75	+67.10
0 0.11	1 6.08	50.99	. .						
0 0.10	0 58.91	52.73	. .						
0 0.08	+ 0 46.82	54.52	. .						
+ 0 0.04	— 0 29.28	330 20 34.20	64.34	1.41	— 0 0.32	10 45 44.07	+ 9 14 9.11	. .	. .
— 0 12.80	0 29.40								
+ 0 43.02	0 32.44	327 16 46.70	. .	.42	0 0.34	11 21 28.57	+ 6 10 21.60	. .	. .
+ 0 47.13	0 32.32								
—14 38.21	0 40.52		. .	.43	0 0.39	12 0 58.29	— 0 6 18.71	. .	. .
+17 18.18	— 0 39.68	321 0 6.38	. .	— 1.43	— 0 0.39				
0 49.74	+ 1 36.55	52 36 57.49	. .						
0 58.75	1 27.13	57.08	. .						
1 4.01	1 22.53	57.74	. .						
1 10.04	1 17.87	59.11	. .						
1 10.38	1 15.23	56.81	. .						
+ 1 12.69	+ 1 13.43	57.32	. .						

NADIR POINTS.				
A.	B.	C.	D.	Means
	Sept.	19,	Night.	° ′ 179 59
59″6	64″1	63″7	61″8	62″30
59.5	63.8	63.2	60.8	61.82
59.6	63.0	63.6	61.0	61.80
60.0	63.2	63.5	61.3	62.00
60.0	64.5	63.5	61.3	62.35
59.74	63.72	63.50	61.26	62.05
	Sept.	21,	12.2*h*.	**179 59**
62.6	65.0	69.7	60.3	64.40
62.5	65.0	69.4	60.2	64.28
62.8	65.1	69.5	60.5	64.48
62.6	64.8	69.4	60.3	64.28
62.6	65.0	69.6	60.2	64.35
62.62	64.98	69.52	60.30	64.35
	Sept.	21, 19*h*		**179 59**
61.2	64.0	67.5	59.8	63.12
61.3	64.2	67.4	59.5	63.10
61.2	64.3	67.3	59.5	63.08
61.3	64.3	67.5	59.4	63.12
61.0	64.1	67.8	59.8	63.18
61.20	64.18	67.50	59.60	63.12
	Sept.	21,	10.5*h*.	**179 59**
61.5	67.0	65.5	62.9	64.22
62.8	67.8	65.3	63.1	64.75
62.2	67.5	65.0	63.0	64.43
62.6	67.3	65.4	62.5	64.45
62.0	68.4	64.4	62.2	64.23
62.22	67.60	65.12	62.74	64.42
	Sept.	22,	Night.	**179 59**
60.0	65.9	64.2	62.0	63.02
60.0	67.0	64.6	62.3	63.48
59.7	66.6	64.9	61.5	63.17
60.7	67.0	64.3	62.1	63.53
60.6	68.5	66.3	62.9	64.58
60.20	67.00	64.86	62.16	63.55
	Sept.	23,	Day.	**179 59**
62.5	66.7	68.9	59.4	64.35
62.7	66.4	68.8	59.2	64.28
62.6	66.5	68.8	59.4	64.32
62.7	66.4	68.9	59.4	64.35
62.8	66.5	69.0	59.3	64.40
62.66	66.48	68.88	59.34	64.34

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Venus .	— 0 0.37	0 6.29
Sun .	. . . .	15 56.35
Venus .	0 0.37	
Mercury	0 0.18	
Sun .	1 4.04	
Venus .	0 0.36	0 6.48
Mercury	— 0 0.17	0 2.12
Sun .	. . . .	15 58.61

Sept. 20. Error of Runs, —0.54. Mic. coincidence, 40*r*108.
" 21. do. +0.40. " 40.100.
" 22. do. 0.27.
" 23. do. +0.00. " 40.110.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS.		A.	B.	C.	D.	Means	Mic.	Barometer.	THI At.
			s.	s.	s.	s.	s.	s.	s.	h. m. s.	°	'	"	"	"	"	"	Revs.	In.	°
Sept. 25	†1	Polaris, S. P. (Mic. 4)								13 2 48.00	52	34	30.8	24.0	35.2	27.4	29.35	42.220	30.022	76.5
	2										"	"	"	"	"	"	"	42.248		
	3										"	"	"	"	"	"	"	42.228		
	4				29.0						"	"	"	"	"	"	"	42.185		
	5										"	"	"	"	"	"	"	42.050		
	6										"	"	"	"	"	"	"	41.950		
	7										"	"	"	"	"	"	"	41.758		
	†8		26.0								"	"	34.7	27.1	38.4	31.5	32.92	41.510	30.008	77.1
	9	β Aquilæ	17.1	28.1	39.0	50.0	0.9	12.1	23.0	19 47 50.03	327	8	56.2	62.4	69.2	57.2	61.25	. .	29.902	73.2
	10	α² Capricorni	2.4	13.8	24.8	36.0	47.1	58.4	9.2	20 9 35.96	308	6	44.8	50.7	62.2	53.1	52.70	. .	29.908	73.8
	11	61¹ Cygni	23.3	38.0	57.2	5.5	19.0	33.1	46.9	21 0 5.29	359	6	41.6	44.3	50.0	42.5	44.60	. .	29.904	73.8
	†12	ζ Cygni	50.5	3.0	15.8	28.1	41.0	53.4	6.1	21 6 28.27	350	42	56.8	59.6	66.8	58.0	60.30	. .		
	13	α Cephei	49.0	12.7	35.8	59.0	22.1	45.9	8.7	21 14 58.74	23	2	39.0	32.6	43.2	37.0	37.95	. .	29.902	73.6
	14	β Aquarii	59.5	10.6	21.4	32.7	43.6	54.4	5.6	21 23 32.54	314	52	58.5	63.6	71.3	61.4	63.70	. .	29.902	74.0
	15	ε Pegasi	9.5	21.0	31.8	42.9	54.0	5.1	16.2	21 36 42.92	330	17	38.4	43.9	48.9	41.1	43.08	. .	29.894	73.5
	16	Saturn, 1st & N. L. .	54.0	..	16.5	..	39.1	..	2.0	21 51 28.53	306	25	23.4	26.1	36.8	27.3	28.40d	. .	29.890	73.2
	17	Saturn, 2d & S.L. (Mic. 4)	..	6.8	..	29.1	..	51.6	..		"	"	"	"	"	"	"	39.530	"	"
	18	α Piscis Aust. . . .	35.9	48.2	1.1	..	26.4	39.2	51.5	22 49 13.72	290	42	55.6	57.8	69.9	59.7	60.75	. .	29.880	73.0
	19	α Pegasi	37.6	49.1	0.2	11.4	22.8	34.1	45.2	22 57 11.49	335	29	56.5	62.8	68.6	59.0	61.72	. .	29.876	73.0
	20	γ Cephei	50.1	39.0	26.0	..	1.4	50.0	37.3	23 33 13.97	37	52	29.4	21.5	32.1	25.5	27.14d	. .	29.866	73.0
	21	α Andromedæ . . .	55.2	7.8	20.1	32.5	44.9	57.2	9.9	0 0 32.51	359	21	21.8	25.3	31.3	22.2	25.15	. .	29.864	72.8
	22	Weisse, O, 368 . .	30.4	42.0	52.2	3.4	14.2	25.5	36.4	0 22 3.44	319	57	5.4	11.3	20.5	10.6	11.95	. .	29.854	72.2
	23	Weisse, O, 479 . .	11.5	22.2	33.8	44.4	55.5	6.3	17.2	0 27 44.41	319	46	22.4	26.9	36.5	36.2	30.50d	. .		
	24	Ceti, 163, (Mic. 4). .	45.2	56.4	7.1	18.2	29.0	40.0	51.1	0 30 18.14	"	"	"	"	"	"	"	40.222		
	25	Weisse, O, 712, (Mic. 4)	0.6	11.6	22.5	33.4	44.1	55.0	6.3	0 40 33.36	"	"	"	"	"	"	"	42.440	29.846	72.0
	26	Polaris	6.0							1 4 56.64	49	35	10.5	3.2	16.1	7.2	9.25	. .	29.844	
	27			9.0								34	58.8	51.3	63.1	55.9	57.28	. .		
	28				59.0								50.5	42.8	54.6	48.2	49.02	. .		
	29					58.0							47.5	39.6	51.2	45.0	45.82	. .	29.839	72.0
	30						51.0						49.7	42.3	53.8	47.3	48.28	. .		
	31							51.0				34	57.3	49.4	61.3	54.4	55.60	. .		
	32								42.5			35	8.8	2.0	14.8	5.6	7.80	. .	29.832	71.9
28	†33	Venus, 2d and N. L.	6.9	18.0	28.8	40.0	51.0	2.1	13.1	11 13 39.99	327	36	32.3	36.0	43.3	33.3	36.22	. .	30.348	61.8
	34	Venus, S.L. (Mic. 4) .	..	..	..	..	..	..	..	. . . . .	"	"	"	"	"	"	"	39.757		
29	†35	Polaris, S. P. (Mic. 4)							49.0	13 5 38.43	52	34	37.4	31.4	42.1	33.9	36.20	41.262	30.313	66.0
	36										"	"	"	"	"	"	"	41.427		
	37							44.0			"	"	"	"	"	"	"	41.637		
	38										"	"	"	"	"	"	"	41.760		
	39						45.0				"	"	"	"	"	"	"	41.869		
	40										"	"	"	"	"	"	"	41.955		
	41					38.0					"	"	"	"	"	"	"	41.971	30.304	67.0
	42										"	"	"	"	"	"	"	41.963		
	48				35.0						"	"	"	"	"	"	"	41.898		
	44										"	"	"	"	"	"	"	41.863		
	45			28.0							"	"	"	"	"	"	"	41.656		
	46										"	"	"	"	"	"	"	41.509		
	†47		30.0								"	"	38.0	31.4	41.7	34.4	36.38	41.340	30.298	67.6
	48	β Aquilæ	19.3	30.4	41.2	52.4	3.3	14.2	25.6	19 47 52.34	327	8	57.9	62.1	68.7	58.5	61.80	. .	30.210	66.0
	†49	Moon, S. L. (Mic. 2)	..							. . . . .	304	59	10.2	15.4	23.1	13.4	15.52	45.142	30.208	65.8
	.50			..							"	"	"	"	"	"	"	45.140		
	51				..						"	"	"	"	"	"	"	45.181		
	†52					..					"	"	"	"	"	"	"	45.250		

DATE.	VALUE OF m.	n.	c.	CLOCK. At 22h.	H. Rate. 0s.
	s.	s.	s.	s.	
Sept. 25	−0.415	+0.429	+0.022	f 1.555	g .014
29	−0.415	+0.429	+0.022	f 4.226	g .018

1 to 8. Micrometer observations taken at 2*m*. 3*s*., 5*m*. 50*s*., 9*m*. 12*s*., 12*m*. 29*s*., 16*m*. 19*m*. 5*s*., 23*m*. 4*s*., 26*m*. 31*s*.

12. Observed for declination at wire VI.

33. Correction of N. L. for defective illumination, +0″.11.

35 to 47. Micrometer observations taken at 44*m*. 55*s*., 48*m*. 32*s*., 51*m*. 54*s*., 56*m*. 6*s*., 58*m*. 2*m*. 19*s*., 5*m*. 47*s*., 9*m*. 6*s*., 11*m*. 45*s*., 16*m*. 15*s*., 19*m*. 40*s*., 23*m*. 7*s*., 26*m*. 40*s*.

49 to 52. Observed for declination at 59*m*. 9*s*., 59*m*. 19*s*., 59*m*. 30*s*., 59*m*. 41*s*., 59*m*. 0*m*. 6*s*., 0*m*. 17*s*.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.		NADIR POINTS.				
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.	A.	B.	C.	D.	Means
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″		Sept.	25,	2h.	° ′
+ 1 12.62	+ 1 12.34	52 36 56.09	. .											179 59
1 13.59	1 11.85	56.57	64.76	− 1.43	+ 2 27.89	13 5 14.46	+ 88 29 28.87	− 10.65	+66.21	61″5	64″6	68″8	60″1	63″75
1 12.90	1 12.56	56.59	. .							61.5	64.3	68.4	59.8	63.50
1 11.42	1 14.38	56.93	. .							61.4	64.0	68.9	59.6	63.48
1 6.78	1 18.04	55.95	. .							61.3	64.6	68.8	59.6	63.57
1 3.33	1 21.71	56.17	. .							61.7	64.5	68.8	59.6	63.65
0 56.73	1 28.25	56.11	. .							61.48	64.40	68.74	59.74	63.59
+ 0 48.20	+ 1 35.22	54.55	. .											
0 0.00	− 0 35.83	327 8 25.42	63.57	.52	− 0 0.34	19 47 48.17	+ 6 2 1.10	+ 8.60	10.06					
− 0 0.05	1 10.77	308 5 41.88	. .	.53	0 0.49	20 9 33.94	− 13 0 42.44	9.76	22.71					
0 0.04	0 0.86	359 6 43.70	. .	.54	0 0.05	21 0 3.70	+ 38 0 19.38	7.00	34.33					
− 0 0.05	− 0 9.16	350 42 51.09	. .	.54	− 0 0.15	21 6 26.58	+ 29 36 26.77	6.70	26.02					
+ 0 0.02	+ 0 23.71	23 3 1.65	. .	.55	+ 0 0.44	21 14 57.63	+ 61 56 37.66	1.84	26.39					
0 0.05	− 0 55.94	314 52 7.81	. .	.55	− 0 0.44	21 23 30.55	− 6 14 16.51	8.92	36.81					
+ 0 0.04	0 33.17	330 17 9.95	. .	.55	0 0.32	21 36 41.05	+ 9 10 45.63	8.09	36.13					
0 0.00	1 15.20	306 24 3.26	. .	.55	0 0.51	21 51 26.47	− 14 42 21.06	. .	. .					
− 0 19.86	1 15.21													
0 0.05	2 26.46	290 40 34.24	. .	.56	0 0.64	22 49 11.52	− 30 25 50.08	9.26	52.75					
0 0.00	− 0 25.46	335 29 36.26	. .	.56	− 0 0.28	22 57 9.65	+ 14 23 11.94	+ 7.89	48.40					
0 0.00	+ 0 43.46	37 53 10.60	. .	.57	+ 0 1.50	23 33 13.90	+ 76 46 46.28	− 0.12	56.48					
0 0.02	− 0 10.51	349 21 14.62	. .	.57	− 0 0.16	0 0 30.78	+ 28 14 50.30	+ 7.87	54.08					
− 0 0.01	0 46.95	319 56 24.99	. .	.58	0 0.40	0 22 1.46	− 1 9 59.33	8.26	54.44					
0 0.00	0 47.25	319 45 43.25	. .	.58	0 0.40	0 27 42.43	− 1 20 41.07	8.27	54.42		Sept.	29,	12h.	179 59
+ 0 3.87	0 47.25	319 45 47.12	. .	.58	0 0.40	0 30 16.16	− 1 20 37.20	8.27	54.42	63.4	67.0	68.6	61.0	65.00
1 20.24	− 0 47.27	319 47 3.47	. .	.58	− 0 0.40	0 40 31.38	− 1 19 20.85	+ 8.27	54.41	63.3	67.0	69.2	60.3	64.95
0 0.21	+ 0 42.75	49 35 52.21	. .							63.0	66.8	69.1	60.2	64.78
0 0.26	0 55.47	53.01	. .							63.0	66.7	69.1	60.3	64.77
0 0.29	1 2.81	52.12	. .							62.9	67.0	69.0	60.0	64.72
0 0.31	1 5.47	51.60	63.59	.58	+ 0 16.72	1 5 11.78	+ 88 29 27.77	− 10.83	66.04					
0 0.30	1 3.23	51.81	. .							63.12	66.90	69.00	60.36	64.84
0 0.27	0 56.02	51.89	. .											
+ 0 0.22	+ 0 44.09	52.11	. .											
− 0 0.08	− 0 33.29	327 35 56.74	64.84	4.03	− 0 0.34	11 13 35.27	+ 6 29 31.15	. .	. .					
− 0 12.19	− 0 33.40													
+ 0 40.26	+ 1 37.61	52 36 54.17	. .											
0 45.49	1 30.51	52.30	. .											
0 52.79	1 24.79	53.88	. .											
0 57.06	1 20.36	53.72	. .											
1 0.80	1 16.33	53.43	. .											
1 3.75	1 15.36	55.41	. .											
1 4.21	1 14.16	54.67	. .	.07	0 17.54	13 5 16.79	+ 88 29 31.57	− 11.83	64.61					
1 4.03	1 14.58	54.91	. .											
1 1.80	1 16.20	54.30	. .											
1 0.59	1 18.39	55.28	. .											
0 53.47	1 23.23	53.00	. .											
0 48.41	1 28.40	53.11	. .								Sept.	29,	10h.	179 59
+ 0 42.60	+ 1 36.20	54.10	. .							60.7	63.7	67.9	58.5	62.70
0 0.00	− 0 37.08	327 8 24.72	62.76	− 4.19	− 0 0.34	19 47 47.81	+ 6 2 1.21	+ 8.67	+ 9.95	60.6	63.8	68.1	58.8	62.82
−11 44.55	+63 22.81		. .							60.6	63.9	68.0	58.8	62.83
11 44.28	63 21.25		. .							60.8	63.5	68.0	58.7	62.75
11 43.21	63 20.02		. .							60.9	63.7	67.8	58.4	62.70
−11 40.83	−63 18.75	305 50 52.83	. .	. .	. . .	. . . .	− 15 15 30.68	. .	. .	60.72	63.72	67.96	58.64	62.76

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Saturn .	. . .	0 9.93
Venus .	— 0 0.35	0 6.11

Sept. 25. Error of Runs, +0″.17; Mic. coincidence, 40r109.
" 29. do. do. +0.44; " 40.105.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.										CIRCLE & MICROMETER READINGS.								Barometer.	THE	
			I.	II.	III.	IV.	V.	VI.	VII.	Mean.					A.	B.	C.	D.	Means	Mic.		At.	
			s.	s.	s.	s.	s.	s.	s.	h.	m.	s.	°	′			′	′	″	Rev.	In.	°	
Sept. 29	†1	Moon, S. L. (Mic. 2)											354	59	10.2	15.4	23.1	13.4	15.52	45.253			
	2												..	..	..	..	..	..	..	45.290			
	†3												..	..	..	..	..	..	..	45.330			
	4	61¹ Cygni	26.2	40.2	53.2	6.5	21.0	35.4	49.6	21	0	7.44	359	6	40.4	43.0	48.9	40.8	43.28	. .	30.210	64.9	5
	5	61² Cygni, (Mic. 4)	..	..	..	..	..	..	..	.	.	.	..	..	..	..	..	..	..	40.036			
	6	β Cephei	11.4	43.5	15.1	46.5	18.2	50.5	12.3	21	26	46.79	30	59	33.9	28.6	35.2	26.6	31.08	. .	30.200	64.0	5
	7	Pegasi, 7627	35.2	47.5	59.3	11.2	23.6	35.5	47.5	21	46	11.40	346	19	16.4	20.1	28.4	18.0	20.73	. .	30.196	63.4	5
	8	Pegasi, 7693	7.1	19.9	32.1	44.4	56.1	9.3	42.6	21	58	44.41	349	20	9.3	12.0	18.3	9.6	12.30	. .	30.198	63.1	5
	9	Lacertæ, 7765	42.4	56.6	10.8	24.4	39.0	53.1	7.2	22	7	24.79	0	4	3.4	4.1	12.1	2.8	5.60	. .	30.198	63.0	5
	†10	Pegasi, 7798	44.2	56.2	9.0	21.0	33.6	46.1	58.2	22	14	21.19	348	40	28.4	31.6	37.0	29.3	31.57	. .	30.196	63.0	5
	11	α Piscis Aust.	38.2	51.2	3.9	16.3	29.0	41.8	54.5	22	49	16.41	290	42	58.3	60.1	73.0	61.5	63.22	. .	30.192	62.6	5
	12	α Pegasi	..	..	2.8	14.2	25.3	36.8	48.0	22	57	25.42	335	29	55.5	60.9	67.0	56.8	60.05	. .	30.180	62.2	5
	13	γ Cephei	..	41.0	29.2	17.0	4.0	52.2	..	23	33	16.68	37	52	26.4	18.1	28.6	21.8	23.72	. .	30.168	61.0	5
	14	α Andromedæ	57.8	10.6	22.6	35.0	47.7	0.1	12.3	0	0	35.16	349	21	21.0	24.1	30.2	21.2	24.12	. .	30.156	60.4	5
	†15	Polaris, (Mic. 4)	13.0										49	31	33.0	26.9	37.9	31.4	32.30	41.141	30.150	60.2	5
	16												“	“	“	“	“	“	“	40.900			
	17			14.0									“	“	“	“	“	“	“	40.724			
	18												“	“	“	“	“	“	“	40.561			
	19				7.0								“	“	“	“	“	“	“	40.489			
	20												“	“	“	“	“	“	“	40.426			
	21					3.0				1	5	2.43	“	“	“	“	“	“	“	40.402	30.150	60.5	5
	22												“	“	“	“	“	“	“	40.421			
	23						56.0						“	“	“	“	“	“	“	40.455			
	24												“	“	“	“	“	“	“	40.545			
	25							55.0					“	“	“	“	“	“	“	40.689			
	26												“	“	“	“	“	“	“	40.885			
	†27								49.0				“	“	33.2	27.5	37.7	30.2	32.15	41.081	30.138	60.0	5
Oct. 3	28	α Cephei	52.5	16.4	39.7	2.5	25.7	48.9	12.3	21	15	2.57	23	2	42.2	35.6	45.5	41.3	41.15	. .	30.052	65.7	5
	†29	β Aquarii	3.3	14.4	25.0	36.4	47.0	58.0	9.3	21	23	36.20	.	.	.	..	..	..	. .	. .			
	30	ε Pegasi	13.3	24.4	35.5	46.4	57.5	8.9	19.9	21	36	46.56	330	17	40.8	44.0	49.0	46.0	44.95	. .	30.050	65.1	5
	31	Saturn, 1st and N. L.	31.3	42.6	53.8	5.3	16.6	28.0	39.0	21	50	5.23	306	18	27.5	29.6	39.2	34.0	32.58	. .			
	32	α Aquarii	28.0	39.9	50.6	1.7	12.5	23.7	34.4	21	58	1.51	320	3	42.0	44.7	51.7	47.0	46.35	. .	30.050	64.3	5
	†33	α Pegasi	..	..	4.7	16.5	27.5	38.8	50.0	22	57	27.50	335	30	0.0	5.0	9.5	2.4	4.22	. .	30.050	62.2	5
	†34	γ Piscium	..	58.5	9.1	20.5	31.5	42.5	53.4	23	9	25.91	323	34	3.1	6.0	15.8	7.0	7.98	. .		62.0	5
	†35	Moon, 1st and S. L.	..	41.2	52.0	3.3	14.5	26.0	37.0	23	56	9.00	322	35	59.5	63.0	71.0	65.0	64.62	. .	30.058	63.0	53
	36	γ Aquilæ	31.5	42.5	53.5	4.7	16.0	27.0	38.1	19	39	4.76	331	21	50.4	52.1	57.0	53.5	53.25	. .	30.182	65.4	59
	37	β Aquilæ	20.5	31.5	42.5	53.1	4.5	15.4	26.5	19	47	53.43	327	8	57.4	60.0	65.2	60.5	60.78	. .	30.182	65.2	59
	38	α² Capricorni	5.6	17.0	28.2	39.4	50.2	2.0	13.1	20	9	39.36	308	6	45.8	50.8	60.5	55.5	53.15	. .	30.192	64.3	59
	†39	61¹ Cygni	27.1	41.3	55.0	9.0	22.5	36.8	50.5	21	0	8.89	359	6	42.2	44.8	51.6	49.0	46.90	. .	30.206	63.9	57
	†40	ζ Cygni	54.0	6.6	19.1	31.9	44.0	57.8	9.6	21	6	31.74	350	43	1.8	3.9	9.5	4.0	4.80	. .	30.206	64.0	57
	41	α Cephei	52.7	16.5	39.3	2.5	25.6	49.0	12.3	21	15	2.56	23	2	40.9	34.0	44.8	40.3	40.00	. .	30.204	63.8	57
	42	β Cephei	12.0	44.6	15.8	48.2	19.5	51.3	23.2	21	26	47.80	30	59	36.8	29.8	39.2	34.2	35.00	. .	30.204	63.3	56
	43	ε Pegasi	23.1	34.5	45.3	56.5	7.5	18.7	29.7	21	36	46.47	330	17	42.0	46.6	50.4	46.8	46.45	. .	30.210	63.2	56
	44	Saturn, 1st and N. L.	13.0	24.8	35.8	47.0	58.2	9.6	20.9	21	49	47.04	306	17	0.3	1.7	9.0	3.8	3.70	. .	30.210	62.5	56
	45	α Piscis Aust.	39.0	52.0	4.4	17.2	30.0	42.8	55.2	22	49	17.23	290	42	60.5	59.6	72.0	64.0	64.02	. .	30.220	61.5	56
	46	γ Cephei	53.8	42.7	30.0	18.0	5.1	53.7	41.0	23	33	17.76	37	52	33.0	26.0	34.8	30.0	30.95	. .	30.000		55
	47	γ Pegasi	54.5	6.0	17.0	28.4	39.4	51.0	2.3	0	5	28.37	335	26	54.8	55.3	61.5	57.4	57.25	. .	30.236	60.3	55
	48	β Ceti	26.3	38.0	49.0	1.0	12.4	24.0	35.5	0	36	0.89	302	18	16.2	19.8	28.0	20.6	21.15	. .			55
	49	Polaris	12.5										49	35	13.1	5.0	18.0	11.1	11.80	. .	30.248	60.0	55
	50			18.0										34	61.2	52.0	64.0	58.5	58.92	. .			
	51				9.5										55.2	45.5	56.2	52.7	52.40	. .	30.248	59.9	5
	52					7.5				1	5	7.07			52.1	43.4	53.8	50.7	50.00	. .			

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 21h.	0s.
	s.	s.	s.	s.	
Sept. 29	−0.415	+0.429	+0.022	f 4.208	g .018
Oct. 3	0.261	0.273	0.022	5.532	g .002
" 5	−0.261	+0.273	+0.022	5.342	l .006

1 to 3. Micrometer observations at 59*m*. 52*s*., 0*m*. 6*s*., 0*m*. 17*s*.

10. Very unsteady.

15 to 27. Micrometer observations taken at 44*m*. 18*s*., 47*m*. 48*s*., 51*m*. 14*s*., 54*m*. 52*s*. 58*m*. 7*s*., 1*m*. 34*s*., 5*m*. 3*s*., 8*m*. 33*s*., 11*m*. 56*s*., 15*m*. 26*s*., 18*m*. 55*s*., 22*m*. 34*s*. 25*m*. 49*s*.

29, 34, 35, 39, 40. Unsteady. Observations not good.

33. Recorded transit diminished one second.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h m. s.	° ′ ″	s.	″
—11 40.73	+63 17.48		62.76						
11 39.46	63 15.85		. .						
11 37.08	+63 15.16		. .						
0 0.10	— 0 0.90	359 6 42.28	. .	— 4.21	— 0 0.05	21 0 3.18	+ 38 0 18.77	+ 7.07	+33.55
— 0 2.47	— 0 0.89	359 6 39.92	. .	. .	. . .	. . . .	+ 38 0 16.41	. .	33.55
+ 0 0.07	+ 0 34.64	31 0 5.79	. .	.22	+ 0 0.82	21 26 43.39	+ 69 53 42.28	— 1.14	28.43
— 0 0.19	— 0 14.10	346 19 6.44	. .	.22	— 0 0.19	21 46 7.99	+ 25 12 42.93	+ 7.17	35.03
+ 0 0.11	0 10.89	349 20 1.52	. .	.22	0 0.16	21 58 40.03	+ 28 13 38.01	7.01	37.17
— 0 0.15	0 0.03	0 4 5.42	62.30	.23	0 0.04	22 7 20.52	+ 38 57 42.37	6.24	37.99
0 0.00	0 11.61	348 40 19.96	. .	.23	0 0.17	22 14 16.79	+ 27 33 56.91	7.12	40.17
— 0 0.15	2 32.37	290 40 30.70	. .	.24	0 0.64	22 49 11.53	— 30 25 51.35	9.28	53.32
0 0.00	— 0 26.48	335 29 33.57	. .	.24	— 0 11.48	22 57 9.70	+ 14 23 10.52	+ 7.91	47.98
+ 0 0.01	+ 0 45.16	37 53 8.89	61.85	.25	+ 0 1.41	23 33 14.04	+ 76 46 46.29	— 0.07	54.96
— 0 0.06	— 0 10.90	349 21 13.16	. .	.26	— 0 0.16	0 0 30.74	+ 28 14 50.56	+ 7.85	53.34
+ 0 35.65	+ 0 45.50	49 35 53.37	. .						
0 27.36	0 52.37	51.95	. .						
0 21.30	0 58.11	51.63	. .						
0 16.38	1 2.48	51.08	. .						
0 13.22	1 5.40	50.84	. .						
0 11.05	1 7.31	50.58	. .						
0 10.22	1 8.02	50.46	61.85	.28	+ 0 16.73	1 5 14.88	+ 88 29 28.62	— 11.83	64.41
0 10.88	1 7.49	50.49	. .						
0 12.05	1 5.77	50.04	. .						
0 15.15	1 2.80	50.17	. .						
0 20.10	0 58.89	50.91	. .						
0 26.85	0 52.84	51.91	. .						
0 33.59	0 46.59	52.40	. .						
0 0.04	+ 0 24.45	23 3 5.64	65.01	5.53	+ 0 0.29	21 14 57.33	+ 61 56 39.88	+ 2.11	24.53
. . .	. . .	. . . . .	. .	.53	— 0 0.27	21 23 30.40	. . . .	9.01	. .
+ 0 0.03	— 0 32.85	330 17 12.13	. .	.53	0 0.19	21 36 40.84	+ 9 10 46.37	8.18	35.67
— 0 0.06	1 26.38	306 17 6.14	. .	.53	0 0.31	21 50 0.00	— 14 49 19.62	. .	. .
0 0.09	0 48.19	320 2 58.07	. .	.53	0 0.24	21 57 55.74	— 1 3 27.69	8.59	41.69
— 0 0.01	0 26.35	335 29 37.86	. .	.54	0 11.46	22 57 9.50	+ 14 23 12.10	7.93	47.61
+ 0 0.11	— 0 42.67	323 33 25.42	. .	.54	0 5.71	23 9 14.66	+ 2 26 59.66	8.27	50.36
— 0 0.01	+52 19.51	323 28 24.12	. .	.37	0 5.72	23 57 6.64	+ 2 21 58.36	. .	. .
0 0.18	— 0 31.39	331 21 21.68	65.01	.35	0 0.19	19 38 59.22	+ 10 14 55.92	8.51	7.89
0 0.00	0 37.11	327 8 23.67	. .	.35	0 0.21	19 47 47.88	+ 6 1 57.91	8.77	9.88
0 0.18	1 12.40	308 5 40.57	. .	.35	0 0.30	20 9 33.71	— 13 0 45.19	9.93	22.98
— 0 0.15	0 0.87	359 6 45.88	. .	.35	0 0.02	21 0 3.52	+ 38 0 20.12	7.18	32.65
+ 0 0.19	— 0 9.44	350 42 55.55	. .	.34	— 0 0.08	21 6 26.32	+ 29 36 29.79	6.86	24.78
0 0.07	+ 0 24.59	23 3 4.66	. .	.34	+ 0 0.30	21 14 57.52	+ 61 56 38.90	+ 2.19	24.11
0 0.08	+ 0 34.77	31 0 9.85	. .	.34	+ 0 0.55	21 26 43.01	+ 69 53 44.09	— 0.84	26.94
0 0.05	— 0 33.07	330 17 13.43	. .	.34	— 0 0.19	21 36 40.94	+ 9 10 47.67	+ 8.20	35.59
+ 0 0.19	1 26.92	306 15 36.97	. .	.34	0 0.31	21 49 42.00	— 14 50 48.79	. .	. .
— 0 0.21	— 2 32.17	290 40 31.64	. .	.33	— 0 0.39	22 49 11.51	— 30 25 54.12	9.33	54.19
— 0 0.29	+ 0 45.13	37 53 15.79	. .	.33	+ 0 0.95	23 33 13.38	+ 76 46 50.03	0.01	53.59
+ 0 0.01	— 0 26.54	335 26 30.72	. .	.32	— 0 0.17	0 5 22.88	+ 14 20 4.96	8.10	53.35
— 0 0.07	— 1 31.61	302 16 49.47	. .	.32	— 0 0.33	0 36 55.24	— 18 49 36.29	+ 8.15	55.38
+ 0 0.28	+ 0 45.47	49 35 57.55	. .						
0 0.35	0 58.17	57.44	. .						
0 0.40	1 5.61	58.41	. .						
+ 0 0.41	+ 1 8.23	58.64	. .	— 5.32	+ 0 10.56	1 5 12.31	+ 88 29 32.09	— 12.50	+62.24

NADIR POINTS.				
A.	B.	C.	D.	Means
	Sep. 29	1.5*h*.		° ′
				179 59
60″2	62″8	67″0	57″6	61″90
60.4	62.6	66.5	57.8	61.82
60.2	62.6	66.6	58.2	61.90
60.0	62.5	66.7	57.7	61.73
60.5	62.6	66.5	58.0	61.90
60.26	62.62	66.66	57.86	61.85
	Oct. 3,	Night.		179 59
64.5	68.0	67.0	64.0	65.88
63.2	67.7	65.4	62.5	64.70
62.2	68.2	65.1	62.0	64.37
65.0	69.0	67.0	63.0	66.00
63.1	68.0	65.2	62.0	63.38
63.1	68.0	65.1	62.0	63.35
63.51	68.15	65.80	62.58	65.01
	Oct. 5,	Night.		179 59
63.2	67.2	66.2	63.2	64.95
63.0	67.5	66.0	63.2	64.92
63.0	68.0	68.7	63.7	65.35
62.4	68.0	65.9	63.0	64.83
62.5	68.5	66.5	62.7	65.00
62.82	67.84	66.22	63.16	65.01

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Saturn .	+ 0 0.61	
Moon .	1 8.73	
Saturn .	+ 0 0.61	

Sept. 29. Error of Runs, +0″44; Mic. coincidence, 40r.105.
Oct. 3. do. do. 0.35.
" 5. do. do. +0.59.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES. I.	II.	III.	IV.	V.	VI.	VII.	Means.	CIRCLE & MICROMETER READINGS. A.	B.	C.	D.	Means	Mic.	Barometer.	THERS. At.	Ex.
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	°
Oct. 5	1	Polaris					2.0				49 34 53.0	44.5	56.2	51.5	51.30	. .	30.248	59.2	54.8
	2							4.0			34 60.1	51.6	63.0	57.6	58.08	. .			
	3								56.0		35 12.8	5.7	17.6	10.0	11.52	. .	30.248	59.2	54.5
	4	Moon, 2d and N. L. .	7.1	18.2	29.9	41.3	52.6	4.8	15.4	1 55 41.33	332 24 44.5	48.0	53.5	47.0	48.25	. .	30.254	59.2	53.5
7	5	Sun, 1st and N. L. .	7.2	18.0	28.9	39.9	51.5	2.0	13.2	12 50 40.04	315 50 42.8	48.2	55.5	46.5	48.25	. .	30.328	66.0	72.7
	6	Sun, 2d L.	17.1	28.4	39.3	50.4	2.3	12.5	23.5	12 52 50.36	. . . .	..	..	..	. . .	. .			
	7	β Aquilæ	20.0	31.0	42.0	53.0	4.0	14.9	26.0	19 47 52.99	327 8 57.1	61.8	69.3	62.5	62.68	. .	30.272	68.0	65.8
	8	α Andromedæ . . .	58.0	10.8	23.0	35.4	47.7	0.5	13.0	0 0 35.49	349 21 28.0	30.0	34.7	29.0	30.42	. .	30.320	65.8	60.8
	9	γ Pegasi	53.3	5.3	16.4	27.5	38.8	50.3	1.5	0 5 27.59	335 26 55.0	56.9	61.5	59.8	58.30	. .	30.322	65.8	61.0
	10	β Ceti	25.5	37.1	48.5	0.3	11.8	23.4	34.9	0 36 0.21	302 18 19.0	20.8	29.8	22.5	23.02	. .			
	†11		15.3								49 35 13.0	9.8	10.8	15.2	15.95	. .	30.324	65.2	60.6
	12			18.3							34 65.3	57.2	69.7	63.3	63.87	. .			
	13				4.4						57.5	48.2	59.5	54.7	54.98	. .	30.324	65.0	59.6
	14	Polaris				9.5				1 5 7.30	53.8	44.4	55.2	51.0	51.10	. .			
	15						0.0				56.0	47.6	58.0	53.7	53.82	. .	30.330	64.9	59.5
	16							8.6			34 61.3	53.0	64.7	59.3	59.58	. .			
	†17								55.5		35 13.2	4.8	17.7	11.0	11.68	. .	30.330	64.9	59.5
8	18	β Lyræ	50.7	4.2	17.4	30.2	43.0	56.5	9.5	18 44 30.21	354 18 13.1	13.4	20.6	13.5	15.15	. .	30.258	70.5	72.0
	19	ζ Aquilæ	53.5	4.9	15.7	27.0	38.4	49.6	0.8	18 58 27.13	334 45 36.0	39.8	42.0	39.8	39.40	. .	30.258	70.6	70.3
	20	δ Aquilæ	..	29.8	40.5	51.5	2.5	13.4	24.5	19 17 57.03	323 56 8.6	14.3	18.7	13.2	13.70	. .	30.362	70.8	69.4
	†21	α Aquilæ	50.5	1.5	12.3	23.5	34.5	45.8	56.6	19 43 23.53	. . . .	..	..	..	. . .	. .		70.8	66.0
	†22	β Aquilæ	19.7	30.5	41.5	52.5	3.5	14.5	25.5	19 47 52.53	327 8 59.2	63.1	71.0	54.6	64.48	. .	30.364	70.8	66.5
	23	α^2 Capricorni	5.0	16.6	27.7	39.0	50.3	..	12.3	20 9 35.13	308 6 52.0	55.4	65.6	59.8	58.20	. .	30.364	70.2	67.6
	24	β Ceti	25.0	37.0	48.4	0.0	11.5	23.0	34.8	0 36 59.96	302 18 17.8	19.3	28.7	20.2	21.50	. .	30.364	66.1	60.8
	25				14.5						49 34 58.0	48.7	60.0	55.5	55.55	. .	30.354	65.5	60.7
	26	Polaris				9.0				1 5 8.00	56.2	46.5	57.5	54.3	53.62	. .			
	27						0.5				57.5	48.2	59.2	55.0	54.98	. .	30.354	65.2	60.9
9	28	ζ Aquilæ	53.2	4.5	15.6	27.0	38.1	49.5	0.8	18 58 26.96	334 45 34.3	38.7	42.8	38.2	38.50	. .	30.206	70.2	71.6
	29	γ Aquilæ	..	41.5	53.5	4.0	14.5	26.0	37.1	19 39 9.43	331 21 50.2	54.6	58.5	50.3	53.40	. .	30.204	72.1	68.5
	30	α Aquilæ	50.5	1.5	12.5	23.7	34.6	45.7	56.8	19 43 23.61	329 35 18.0	20.5	27.0	19.6	21.28	. .	30.204	72.0	68.8
	†31	β Aquilæ	19.5	30.5	41.2	52.0	3.3	14.5	25.4	19 47 52.34	327 8 57.4	60.0	67.0	62.0	61.60	. .	30.204	72.0	68.3
	32	α^2 Capricorni	4.5	15.9	26.8	38.2	49.5	0.6	11.9	20 9 38.20	308 6 45.0	51.0	60.0	55.0	52.75	. .	30.204	71.7	68.0
	33	β Cephei	10.5	43.0	14.5	46.0	13.8	50.0	21.7	21 26 46.29	30 59 40.9	31.8	41.0	37.0	37.68	. .	30.196	70.3	64.8
	†34	ε Pegasi	12.0	23.2	34.4	45.0	56.2	7.3	18.6	21 36 45.24	330 17 43.0	46.5	50.8	46.5	46.70	. .	30.196	70.1	65.0
	35	Saturn, 1st and N. L.	39.1	50.8	2.0	13.2	24.5	36.0	47.3	21 49 13.27	306 14 26.7	27.0	36.0	31.2	30.22	. .	30.174	70.0	64.8
	†36	α Aquarii	27.8	38.8	49.5	0.5	11.3	22.3	33.4	21 58 0.51	320 3 38.5	43.3	49.6	45.0	44.10	. .	30.184	70.0	64.6
	37	α Piscis Aust. . . .	38.0	51.0	3.2	16.3	28.9	41.6	54.3	22 49 16.19	290 42 59.4	59.5	70.8	64.2	63.48	. .	30.192	68.7	64.2
	†38	α Pegasi	..	51.1	2.7	14.2	25.0	36.7	48.0	22 57 19.63	335 29 59.7	65.2	69.9	64.3	64.28	. .	30.192	68.7	64.1
	39	γ Cephei	52.5	41.1	28.2	16.1	4.1	2.0	50.2	23 33 16.31	37 52 36.2	27.7	37.3	34.1	33.82*d*	. .	30.188	68.0	63.6
	40	α Andromedæ . . .	57.9	10.3	22.5	35.0	47.5	0.0	12.4	0 0 35.09	349 21 29.3	30.6	35.4	30.5	31.45	. .	30.182	67.7	64.2
	†41	γ Pegasi	..	5.0	16.0	27.4	38.5	50.0	1.2	0 5 33.02	335 26 54.3	55.0	61.4	58.0	57.18	. .	30.182	67.4	64.3
11	42	β Aquilæ	19.8	31.0	4.6	53.0	3.8	15.0	25.8	19 47 52.86	327 8 59.7	63.9	71.0	65.3	64.98	. .	30.436	60.8	55.1
	†43	61^1 Cygni	26.8	41.0	54.1	8.0	22.2	..	50.0	21 0 3.68	359 6 46.8	46.3	57.2	47.0	49.32	. .		59.4	51.7
	44	α Cephei	52.0	15.6	38.3	2.0	25.1	48.6	11.6	21 15 1.89	23 2 45.4	38.0	47.7	44.0	43.78	. .		59.3	53.0
	45	β Aquarii	..	..	24.5	35.5	46.6	57.7	8.6	21 23 46.58	. . . .	..	..	..	. . .	. .			
	46	β Cephei	11.3	43.5	14.5	46.6	18.5	50.7	21.9	21 26 46.71	30 59 39.3	31.8	40.3	36.0	36.85	. .	30.436	59.0	51.5
	47	ε Pegasi	12.6	23.8	34.7	46.0	57.0	8.2	19.2	21 36 45.93	330 17 46.0	49.8	53.0	50.5	49.82	. .	30.436	59.0	51.3
	†48	Saturn, 1st and N. L. .	25.6	37.2	48.3	59.7	11.0	22.5	33.6	21 48 59.70	306 13 26.1	27.6	37.5	31.0	30.55*d*	. .		58.8	50.7
	†49	β Ceti	25.6	37.0	48.8	0.5	11.8	23.7	35.0	0 36 0.34	. . . .	..	..	..	. . .	. .			
	†50		19.5								. . . .	..	..	..	. . .	. .			
	51			17.5							. . . .	..	..	..	. . .	. .			
	†52	Polaris			12.5					0 59 38.10	. . . .	..	..	..	. . .	. .			

DATE.	VALUE OF m.	n.	c.	CLOCK. At 21*h*.	H. Rate. 0*s*.
	s.	s.	s.	s.	
Oct. 7	—0.261	+0.273	+0.022	*f* 4.757	*l* .013
8	.261	.273	.022	4.427	*l* .010
9	.261	.273	.022	4.288	*g* .004
11	—0.261	+0.273	+0.022	*f* 4.896	*g* .008

11 to 17. A little unsteady.
21, 49. Unsteady, and badly defined.
22, 34, 36. Unsteady.
31, 38. 41, 43. Observations not good.
48. Faint and very unsteady.
50 to 52. Wires not seen distinctly. Poor observations.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 359°59′	COR. IN AR. Clock.	COR. IN AR. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
+ 0 0.40	+ 1 5.92	49 35 57.62	65.01						
0 0.35	0 58.57	57.00	. .						
+ 0 0.29	0 46.48	58.29	. .						
— 0 0.16	+10 38.07	332 35 26.16	. .	— 5.31	— 0 0.18	1 54 27.00	+ 11 29 0.40	. .	. .
+ 0 0.07	—16 50.93	315 33 57.39	64.93	4.86	0 0.26	12 51 40.08	— 5 32 28.29	. .	. .
. . .	. . .	. . . .	. .	.86	0 0.26				
— 0 0.01	0 36.79	337 8 25.88	. .	.76	0 0.21	19 47 48.02	+ 6 2 0.20	+ 8.81	+ 9.86
0 0.14	0 10.83	349 21 19.45	. .	.72	0 0.09	0 0 30.86	+ 28 14 53.77	7.85	51.95
0 0.28	0 26.33	335 26 31.69	. .	.72	0 0.17	0 5 22.70	+ 14 20 6.01	8.10	53.08
— 0 0.11	— 1 30.87	302 16 52.04	. .	.71	— 0 0.15	0 35 55.35	— 18 49 33.64	+ 8.14	55.60
+ 0 0.28	+ 0 45.02	49 35 61.25	. .						
0 0.35	0 57.62	61.84	. .						
0 0.38	1 4.96	60.32	. .						
0 0.40	1 7.75	59.25	. .	.70	+ 0 10.56	1 5 13.16	+ 88 29 34.10	— 12.93	+61.51
0 0.39	1 5.50	59.71	. .						
0 0.37	0 58.05	58.00	. .						
+ 0 0.29	+ 0 46.14	58.11	. .						
— 0 0.06	— 0 5.62	354 18 9.47	65.12	.45	— 0 0.05	18 44 25.72	+ 33 11 43.60	+ 6.88	—12.45
— 0 0.16	0 26.62	334 45 12.62	. .	.45	0 0.17	18 58 22.51	+ 13 38 46.75	8.49	— 4.14
+ 0 0.19	0 41.31	323 55 32.58	. .	.44	0 5.71	19 17 46.88	+ 2 49 6.71	9.24	+ 4.94
. . .	. . .	. . . .	. .	.44	0 0.22	19 43 18.87	. . . .	8.78	. .
— 0 0.01	0 36.84	327 8 27.63	. .	.44	— 0 0.27	19 47 47.82	+ 6 2 1.76	8.82	9.87
+ 0 0.23	1 12.47	308 5 45.96	. .	.42	+ 0 2.87	20 9 33.58	— 13 0 39.91	9.97	23.06
— 0 0.08	— 1 31.05	302 16 50.37	. .	.39	— 0 0.33	0 36 55.24	— 18 49 35.50	+ 8.14	55.72
+ 0 0.36	+ 1 5.13	49 36 1.04	. .						
0 0.37	1 7.68	1.67	. .	.39	+ 0 11.33	1 5 14.94	+ 88 29 35.27	— 13.13	+61.11
+ 0 0.36	+ 1 5.36	0.70	. .						
— 0 0.12	— 0 26.51	334 45 11.87	64.51	.28	— 0 0.17	18 58 22.51	+ 13 38 46.61	+ 8.51	— 4.12
— 0 0.16	0 30.87	331 21 22.37	. .	.28	0 5.75	19 38 59.40	+ 10 14 57.11	8.58	+ 7.87
+ 0 0.12	0 33.17	329 34 48.23	. .	.28	0 0.20	19 43 19.13	+ 8 28 22.97	8.80	10.76
0 0.00	0 36.59	327 8 25.01	. .	.28	0 0.21	19 47 47.85	+ 6 1 59.75	8.84	9.87
— 0 0.16	— 1 12.02	308 5 40.57	. .	.28	— 0 0.30	20 9 33.62	— 13 0 44.69	+ 9.99	23.10
0 0.07	+ 0 34.20	30 0 11.81	. .	.29	+ 0 0.55	21 26 42.55	+ 69 53 46.55	— 0.66	26.04
— 0 0.04	— 0 32.48	330 17 14.18	. .	.29	— 0 0.19	21 36 40.76	+ 9 10 48.92	+ 8.25	35.44
+ 0 0.09	1 25.61	306 13 4.07	. .	.29	0 0.31	21 49 9.30	— 14 53 20.56	. .	. .
— 0 0.13	0 47.66	320 2 56.31	. .	.29	0 0.24	21 57 55.98	— 1 3 28.95	8.65	41.70
0 0.19	2 59.53	290 40 33.76	. .	.30	0 0.39	22 49 11.50	— 30 25 51.50	9.36	54.76
— 0 0.01	— 0 25.99	335 29 38.28	. .	.30	— 0 5.77	22 57 9.56	+ 14 23 13.02	7.96	47.13
+ 0 0.01	+ 0 44.38	37 53 18.21	. .	.30	+ 0 0.95	23 33 12.96	+ 76 46 52.95	0.16	51.50
— 0 0.10	— 0 10.72	349 21 20.63	. .	.30	— 0 0.09	0 0 30.70	+ 28 14 55.37	7.84	51.63
+ 0 0.01	0 26.04	335 26 31.15	. .	.30	0 5.83	0 5 22.89	+ 14 20 5.87	8.10	52.93
— 0 0.02	0 37.78	327 8 27.18	65.81	.89	— 0 0.21	19 47 47.76	+ 6 2 0.62	8.88	9.89
— 0 0.17	— 0 0.87	359 6 48.28	. .	.90	+ 0 4.62	21 0 3.40	+ 38 0 21.72	7.30	31.90
+ 0 0.29	+ 0 24.99	23 3 9.06	. .	.90	+ 0 0.30	21 15 57.29	+ 61 56 42.52	2.40	22.97
. . .	. . .	. . . .	. .	.90	— 0 11.27	21 23 30.41	. . . .	+ 9.12	. .
0 0.05	+ 0 35.37	31 0 12.27	. .	.90	+ 0 0.55	21 26 42.36	+ 69 53 45.71	— 0.55	25.62
+ 0 0.03	— 0 33.60	330 17 16.25	. .	.90	— 0 0.19	21 36 40.84	+ 9 10 49.69	+ 8.28	35.38
0 0.00	— 1 28.50	306 12 2.05	. .	.90	0 0.31	21 48 54.90	— 14 54 24.51	. .	. .
. . .	. . .	. . . .	. .	.92	— 0 0.33	0 35 55.09	. . . .	+ 8.14	. .
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	— 4.93	+ 5 42.94	1 5 16.11	. . . .	— 13.40	+59.88

NADIR POINTS. A.	NADIR POINTS. B.	NADIR POINTS. C.	NADIR POINTS. D.	NADIR POINTS. Means
	Oct. 7,	Night.		° ′
				179 59
62″6	69″0	65″8	63″8	65″30
62.5	69.0	65.7	63.1	65.08
62.6	69.0	65.5	62.4	64.87
62.3	69.0	65.0	62.3	64.65
62.2	68.3	66.2	62.3	64.75
62.44	68.86	65.64	62.78	64.93
	Oct. 8,	Night.		**179 59**
61.9	66.8	65.8	63.1	64.40
61.8	68.3	66.8	63.6	65.12
62.0	68.5	66.0	62.6	64.78
62.6	69.0	66.8	64.0	65.60
62.8	69.2	67.0	64.0	65.75
62.22	68.36	66.48	63.46	65.13
	Oct. 9,	Night.		**179 59**
62.1	68.4	65.4	62.4	64.57
62.1	67.6	65.8	62.0	64.38
61.7	68.0	65.7	62.6	64.50
61.8	67.8	65.8	62.9	64.57
62.0	68.0	65.5	62.6	64.53
61.94	67.96	65.64	62.50	64.51
	Oct. 11.			**179 59**
63.0	68.0	66.3	64.2	65.38
64.0	70.5	67.5	65.0	66.75
63.0	68.0	65.8	63.0	64.95
63.5	70.0	67.5	63.8	66.20
63.38	69.12	66.78	64.00	65.82

Object.	COR. IN AR. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Saturn .	+ 0 0.61	
Saturn .	+ 0 0.61	

Oct. 7. Error of Runs, +0″79.
" 8. do. 0.75.
" 9. do. 0.56.
" 11. do. +0.51.
" 11. Observation for nadir point not good. Wind high and mercury tremulous.

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.		TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THE
				I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.
				s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°
Oct. 11	1		Polaris				13.5				..	..	..	..	..	..	. .		
	2								7.5		..	..	..	..	..	..	. .		
14	3		Sun, 1st and N. L.	55.0	6.7	17.5	28.5	39.5	50.8	1.8	13 16 28.54	313 11 59.0	64.8	76.2	62.2	65.55	. .	29.841	61.0
	†4		Sun, 2d L.	5.9	17.0	28.0	39.0	50.1	1.1	12.3	13 18 39.06	..	..	..	..	..	. .		
	†5	α^2	Capricorni	5.0	16.5	27.4	39.0	50.1	1.4	12.8	20 9 38.89	308 6 45.7	54.8	66.6	58.3	56.35	. .	29.840	58.2
	6	61^1	Cygni	26.8	40.5	54.5	8.4	22.3	36.3	50.3	21 0 8.44	359 6 40.4	47.0	54.0	46.0	46.85	. .	29.858	58.3
	7	ζ	Cygni	53.8	6.5	19.0	31.5	44.0	56.5	9.2	21 6 31.50	350 42 53.1	61.0	67.0	60.0	60.28	. .	29.858	58.2
	8	α	Cephei	..	15.5	38.5	1.6	25.0	48.3	11.5	21 15 13.40	23 2 38.5	35.8	47.5	41.0	40.70	. .	29.858	57.5
	9	β	Aquarii	..	13.9	24.9	35.7	46.9	58.0	8.9	21 23 41.38	..	..	..	..	..	. .		
	10	β	Cephei	11.1	43.5	15.1	47.0	19.0	50.9	22.6	21 26 47.03	30 59 33.0	31.3	41.8	34.3	35.10	. .	29.850	56.8
	†11	α	Aquarii	28.5	40.0	50.5	1.9	12.5	23.3	34.5	21 58 1.60	320 3 33.8	43.8	52.2	44.2	43.50	. .	29.850	55.1
16	†12	α^2	Capricorni	6.3	17.5	28.3	40.0	51.1	2.7	13.7	20 9 39.94	308 6 45.1	52.7	60.6	57.0	53.85	. .	30.131	62.3
	†13	γ	Pegasi	55.1	6.5	17.4	29.0	40.0	51.4	3.7	0 5 28.91	..	..	..	..	..	. .		
	14	α	Cassiopeiæ	1.5	21.4	40.5	0.0	19.3	38.8	58.1	0 31 59 94	..	..	..	..	..	. .		
	15	β	Ceti	..	..	..	1.7	13.0	24.6	36.0	0 36 18.82	..	..	..	..	..	. .		
	†16		Polaris	8.5							1 3 53.75	49 35 20.1	17.6	29.2	20.1	21.75	. .	30.132	63.4
	17				11.5							35 9.8	6.4	20.0	10.0	11.55	. .		
	18					7.5						34 60.0	56.6	70.1	61.0	61.92	. .		
	19						4.5					57.1	54.0	66.3	57.8	58.80	. .	30.132	63.2
	20							..				60.0	55.5	68.5	60.0	61.00	. .		
	21								58.5			35 6.0	2.5	16.3	6.4	7.80	. .		
	†22									52.0		35 14.7	12.8	25.0	16.8	17.33	. .	30.132	63.0
	23	α	Arietis	5.0	17.4	29.0	41.0	52.5	5.0	16.5	1 58 40.91	..	..	..	..	..	. .		
19	24		Sun, 1st L.	38.5	49.7	0.8	12.0	22.7	34.2	45.4	13 35 11.90	..	..	..	..	..	. .		
	25		Sun, 2d & N. L.	49.5	0.9	12.0	23.0	34.0	45.2	56.3	13 37 22.99	311 21 52.0	60.0	69.0	67.6	62.15	. .	30.265	50.8
	26	β	Aquilæ	21.5	32.6	43.5	54.5	5.5	16.5	27.5	19 47 54.51	327 8 57.0	60.0	68.0	60.5	61.38	. .	30.218	53.1
	27	γ	Ceti	57.0	9.2	20.0	30.5	41.6	52.6	3.5	2 35 30.63	..	..	..	..	..	. .		
21	†28	ζ	Cygni	56.0	8.5	21.0	33.5	46.0	59.0	11.5	21 6 33.64	..	..	..	..	..	. .		
	†29	ζ	Pegasi	25.6	36.8	47.7	58.8	9.8	20.9	32.0	22 33 58.80	331 9 10.1	18.3	25.2	19.0	18.15	. .	30.238	49.0
	†30	α	Pegasi	43.4	54.9	6.1	17.6	29.0	40.2	51.3	22 57 17.50	335 30 1.1	12.2	18.8	9.5	10.40	. .	30.248	48.7
	31	γ	Cephei	56.0	45.0	31.6	20.0	7.6	56.1	43.5	23 33 19.97	37 52 37.1	32.9	43.5	38.2	37.92*d*	. .	30.248	47.0
	32	α	Andromedæ	1.3	14.0	26.5	38.7	51.0	3.7	16.0	0 0 38.74	..	..	..	..	..	. .		
	†33	γ	Pegasi	57.0	8.5	20.0	31.0	42.4	53.5	4.9	0 5 31.04	..	..	..	..	..	. .		
	34		Polaris	8.5							1 5 2.29	49 35 20.3	17.9	30.3	22.6	22.78	. .	29.936	52.3
	35				12.0							35 7.5	3.5	17.0	8.0	9.00	. .		
	36					6.0						34 59.0	55.6	68.8	61.0	61.10	. .	29.936	52.0
	37						1.0					57.8	54.4	66.7	59.0	59.48	. .		
	†38							58.5				34 59.0	55.6	68.5	60.0	60.78	. .	29.936	52.0
	39								58.5			35 6.0	1.8	16.0	8.9	8.18	. .		
	40									51.5		35 17.0	14.4	26.7	17.8	18.98	. .	29.936	52.0
23	†41		Sun, 1st L.	49.0	0.6	11.7	22.7	33.8	45.0	56.1	13 50 22.70	..	..	..	..	..	. .		
	42		Sun, 2d L.	1.0	12.5	23.3	34.5	45.7	57.0	8.2	13 52 34.60	..	..	..	..	..	. .		
	43	α	Bootis	13.6	25.5	36.7	48.8	0.2	11.9	23.7	14 8 48.63	341 5 42.8	48.6	56.8	48.2	49.10	. .	30.125	50.3
	44	ε	Pegasi	16.5	27.5	38.6	49.8	0.9	12.0	23.1	21 36 49.77	330 17 40.1	49.6	55.3	48.0	48.25	. .	29.934	53.0
	45	α	Aquarii	32.0	43.2	54.0	5.0	16.0	27.0	38.0	21 58 5.03	320 3 36.8	47.3	51.5	48.6	47.30	. .	29.932	53.1
	46	ζ	Pegasi	26.3	37.6	48.7	59.8	11.0	22.0	33.0	22 33 59.77	331 9 8.9	15.2	23.0	14.0	15.28	. .	29.926	53.0
	47	α	Piscis Aust.	42.5	55.5	8.2	20.8	33.4	46.1	58.8	22 49 20.76	290 42 56.6	62.1	76.2	65.0	64.98	. .	29.926	
	48	α	Pegasi	44.6	56.0	7.4	18.4	29.8	41.1	52.3	22 57 18.51	335 29 59.3	70.0	76.0	66.9	68.05	. .	29.926	53.2
	49	γ	Cephei	55.7	44.8	32.0	20.5	8.3	56.5	43.6	23 33 20.20	37 52 37.0	34.5	44.3	39.1	38.73*d*	. .	29.926	53.0
	50	α	Andromedæ	2.4	15.0	27.1	39.8	52.1	4.5	17.0	0 0 39.70	349 21 26.2	33.0	38.8	31.4	32.35	. .	29.926	53.0
24	†51	61^1	Cygni	31.0	45.2	58.4	12.5	26.7	40.6	54.5	21 0 12.70	359 6 40.5	48.8	55.0	47.0	47.82	. .	29.926	57.2
	52	ζ	Cygni	..	10.6	22.8	35.5	48.1	1.0	13.4	21 6 41.90	350 42 57.2	64.5	73.0	63.2	64.48	. .	30.040	57.0

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	*n.*	*c.*	At 22*h.*	0*s.*
	s.	s.	s.	s.	
Oct. 14	−0.261	+0.273	+0.022	*f* 5.139	*g* .008
16	0.530	0.507	0.022	5.709	.010
19	0.530	0.507	0.022	6.303	.018
21	0.530	0.507	0.022	7.708	.024
23	0.530	0.507	0.022	8.662	.021
24	−0.530	+0.507	+0.022	*f* 9.203	*g* .023

4. A little tremulous. Clamp working badly.
5, 12, 13, 33, 38. Very unsteady.
11. Observed through clouds.
16 to 22. A little unsteady from I to VI. Very unsteady at VII.
28, 47. Blurred and unsteady.
29. Very unsteady. Clamp working badly.
30, 51. Observation not good.
41. A little unsteady.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
+ 0 0.02	—16 58.59	312 55 6.98	64.92	— 5.07	— 0 0.28	13 17 28.45	— 8 11 18.69	. .	. .
. . .	. . .	. . . .	. .	.07	0 0.28				
— 0 0.18	1 13.62	308 5 42.55	. .	.12	0 0.30	20 9 33.47	— 13 0 43.12	+ 10.08	+23.30
0 0.15	0 0.87	359 6 45.83	. .	.13	0 0.02	21 0 3.34	+ 38 0 20.16	7.36	31.59
— 0 0.20	— 0 9.50	350 42 50.59	. .	.13	0 0.08	21 6 26.29	+ 29 36 24.92	7.02	23.99
+ 0 0.07	+ 0 24.76	23 3 5.53	. .	.13	0 11.36	21 14 56.91	+ 61 56 39.86	2.52	22.45
. . .	. . .	. . . .	. .	.13	— 0 5.79	21 23 30.46	. . . . .	+ 9.16	. .
— 0 0.19	+ 0 34.96	31 0 9.87	. .	.13	+ 0 0.55	21 26 42.45	+ 69 53 44.20	— 0.39	25.02
+ 0 0.07	— 0 48.83	320 2 54.74	. .	.14	— 0 0.24	21 57 56.22	— 1 3 30.93	+ 8.71	41.77
0 0.25	— 1 12.56	308 5 41.54	64.56	.69	0 0.62	20 9 33.63	— 13 0 43.77	10.11	23.39
. . .	. . .	. . . .	. .	.73	— 0 0.38	0 5 22.80	. . . . .	8.11	. .
. . .	. . .	. . . .	. .	.73	+ 0 0.25	0 31 54.46	. . . . .	7.35	. .
. . .	. . .	. . . .	. .	.74	— 0 17.96	0 36 55.12	. . . . .	+ 8.13	. .
0 0.27	+ 0 44.30	49 36 6.32	. .						
0 0.36	0 56.99	8.90	. .						
0 0.40	1 4.60	6.92	. .						
0 0.43	1 7.25	6.48	. .	.74	+ 1 28.00	1 5 16.01	+ 88 29 40.97	— 13.38	57.98
0 0.41	1 4.57	5.98	. .						
0 0.37	0 57.89	5.97	. .						
0 0.29	+ 0 45.80	3.42	. .						
. . .	. . .	. . . .	. .	.75	— 0 0.29	1 58 34.87	. . . . .	+ 8.74	. .
. . .	. . .	. . . .	. .	6.15	0 0.60				
0 0.00	—17 5.79	311 4 56.36	68.09	.15	0 0.60	13 36 10.69	— 10 1 32.48	. .	. .
0 0.00	0 38.29	327 8 23.09	. .	.25	0 0.45	19 47 47.81	+ 6 1 54.25	9.02	10.05
. . .	. . .	. . . .	. .	.39	0 0.48	2 35 23.76	. . . . .	8.20	. .
. . .	. . .	. . . .	66.23	7.69	0 0.70	21 6 26.25	. . . . .	7.16	. .
0 0.01	0 33.03	331 8 45.19	. .	.72	0 0.42	22 33 50.66	+ 10 2 18.21	8.24	44.45
0 0.00	— 0 27.41	335 29 42.99	. .	.73	— 0 0.38	22 57 9.39	+ 14 23 16.01	8.07	46.43
0 0.00	+ 0 46.80	37 53 24.72	. .	.75	+ 0 1.72	23 33 13.94	+ 76 46 57.78	0.61	47.56
. . .	. . .	. . . .	. .	.76	— 0 0.23	0 0 30.75	. . . . .	7.88	. .
. . .	. . .	. . . .	. .	.76	— 0 0.38	0 5 22.90	. . . . .	+ 8.12	. .
0 0.20	0 45.80	49 36 8.78	. .						
0 0.25	0 58.52	7.77	. .						
0 0.29	1 5.95	7.34	. .						
0 0.30	1 8.94	8.72	. .	.78	+ 0 19.60	1 5 14.11	+ 88 29 40.93	— 13.14	+56.26
0 0.29	1 6.72	7.79	. .						
0 0.25	0 59.65	8.08	. .						
+ 0 0.21	+ 0 47.68	6.87	. .						
. . .	. . .	. . . .	. .	8.49	— 0 0.61	13 51 19.55	. . . . .	. .	. .
. . .	. . .	. . . .	. .	.49	0 0.61				
— 0 0.01	— 0 20.03	341 5 29.06	65.94	.50	0 0.32	14 8 39.81	+ 19 59 2.37	+ 9.84	—68.77
— 0 0.01	0 33.21	330 17 15.03	. .	.65	0 0.42	21 36 40.70	+ 9 10 48.34	8.45	+35.22
+ 0 0.05	0 48.69	320 2 58.66	. .	.66	0 0.52	21 57 55.85	— 1 3 28.03	8.83	41.98
+ 0 0.01	0 32.05	331 8 43.24	. .	.67	0 0.42	22 33 50.68	+ 10 2 16.55	8.27	44.41
— 0 0.03	2 32.69	290 40 32.26	. .	.68	0 0.80	22 49 11.28	— 30 25 54.43	9.52	56.76
0 0.00	— 0 26.54	335 29 41.51	. .	.68	— 0 0.37	22 57 9.46	+ 14 23 14.82	8.09	46.35
— 0 0.01	+ 0 45.32	37 53 24.04	. .	.69	+ 0 1.72	23 33 13.23	+ 76 46 57.35	0.71	46.94
+ 0 0.02	— 0 10.98	349 21 21.39	. .	.70	— 0 0.23	0 0 30.77	+ 28 14 54.70	7.89	49.65
0 0.02	0 0.87	359 6 46.97	66.32	.18	0 0.11	21 0 3.41	+ 38 0 19.90	7.58	30.83
+ 0 0.03	— 0 9.52	350 42 54.99	. .	— 9.18	— 0 6.53	21 6 26.19	+ 29 36 27.92	+ 7.21	+23.48

NADIR POINTS.				
A.	B.	C.	D.	Means
	Oct.	14.		° ′
				179 59
62″1	69″6	67″4	59″5	64″65
62.1	71.0	67.0	59.5	64.90
62.5	72.0	67.6	59.5	65.40
62.1	71.2	66.8	59.0	64.78
62.1	71.2	67.0	59.3	64.90
62.18	71.00	67.16	59.36	64.93
	Oct.	16.		**179 59**
62.1	71.2	67.9	60.0	65.30
62.0	71.6	66.5	59.5	64.90
62.0	70.7	67.2	59.5	64.85
61.0	70.4	66.0	58.0	63.85
61.2	70.1	66.0	58.5	63.75
61.66	70.80	66.72	59.10	64.57
	Oct.	19,	Night.	**179 59**
65.5	75.1	70.6	62.5	68.42
65.2	74.0	70.5	62.1	67.95
65.3	74.0	70.5	62.2	68.00
65.3	74.0	70.5	62.2	68.00
65.32	74.28	70.52	62.25	68.09
	Oct.	21.		**179 59**
62.7	73.2	70.5	61.7	67.02
63.8	72.4	67.3	59.3	65.70
63.7	71.5	67.7	59.0	65.48
65.0	74.0	69.8	60.4	67.30
63.1	72.0	67.0	60.6	65.68
63.66	72.62	68.46	60.20	66.23
	Oct.	23.		**179 59**
63.5	71.6	67.9	59.8	65.70
64.0	72.2	68.3	61.0	66.38
63.9	73.1	68.1	60.5	66.40
63.0	72.0	67.0	59.0	65.25
63.5	73.0	67.4	60.0	65.97
63.58	72.38	67.74	60.06	65.94

Object.	COR. IN Æ.	Observed Vertical Semi-diameters.
	Semi-diam.	
	m. s.	′ ″

Oct. 14. Error of Runs, +0″59.
" 21. do. do. 0.03.
" 23. do. do. +0.10.
" 24. do. do. —0.11.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THE
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.
			s.	s.	s.	s.	s.	s.	s.	H. M. s.	° ′ ″	″	″	″	″	Revs.	In.	°
Oct. 24	1	α Cephei	56.3	19.0	41.0	5.0	28.0	51.5	15.7	21 15 5.21	23 2 42.0	41.0	52.2	46.3	45.38	. .	30.040	57.0
	2	β Aquarii	7.0	18.2	29.0	40.1	51.0	2.0	13.0	21 23 40.04	. . . .	..	..	..	. .	. .		
	3	β Cephei	14.7	46.9	18.9	50.5	22.5	54.5	26.3	21 26 50.66	30 59 34.5	33.0	42.0	37.0	36.62	. .	30.042	56.7
	†4	ε Pegasi	17.0	28.5	39.1	50.0	1.5	12.6	23.3	21 36 50.29	330 17 37.0	48.3	53.1	47.0	46.35	. .	30.042	56.7
	†5	Neptune	6.6	18.1	29.1	40.1	51.6	3.0	14.0	21 51 40.36	307 34 10.8	17.5	29.5	21.2	19.75	. .	30.048	55.8
	6	B. Zone, 119, (Mic. 2)	..	..	..	0.5	11.5	22.7	34.0	21 53 17.18	" " "	"	"	"	"	45.200		
	7	ζ Pegasi	27.0	38.4	49.4	0.4	11.5	22.8	33.8	22 34 0.47	331 9 7.1	15.8	22.6	15.6	15.28	. .	30.072	54.2
	†8	α Piscis Aust. . . .	..	56.0	8.5	21.2	33.6	46.8	59.7	22 49 27.63	290 42 56.0	63.0	76.3	65.3	65.15	. .	30.080	53.7
	†9	α Pegasi	45.0	..	8.0	19.1	30.4	42.0	53.0	22 57 22.92	335 29 56.5	68.0	74.7	65.2	66.10	. .		
25	10							30.0			. . . .	..	..	..	. .	. .		
	11						35.0				. . . .	..	..	..	. .	. .		
	†12	Polaris, S. P. . .				37.0				13 5 38.50	. . . .	..	..	..	. .	. .		
	13				45.5						. . . .	..	..	..	. .	. .		
	14			45.0							. . . .	..	..	..	. .	. .		
	15	ζ Cygni	58.3	11.0	23.4	36.4	48.5	1.8	14.0	21 6 36.20	. . . .	..	..	..	. .	. .		
	16	β Aquarii	7.5	18.5	29.5	40.5	51.5	2.5	13.5	21 23 40.50	. . . .	..	..	..	. .	. .		
	17	β Cephei	14.9	47.5	19.0	51.0	22.8	54.8	26.9	21 26 50.99	30 59 37.0	35.1	44.2	57.3	38.40	. .	30.368	53.2
	18	ε Pegasi	17.5	28.8	39.6	50.5	1.7	13.1	24.1	21 36 50.76	330 17 40.5	49.1	55.3	49.0	48.48	. .	30.368	53.0
	19	Aquarii, 7648 . . .	45.7	57.2	8.0	19.5	30.8	42.0	53.5	21 50 19.53	. . . .	..	..	..	. .	. .		
	20	Neptune	5.0	16.5	27.9	39.2	50.5	1.8	13.0	21 51 39.13	307 34 7.0	11.8	25.0	15.8	14.90	. .	30.364	52.5
	21	Bessel's Zone, 119 .	..	38.3	49.5	0.5	11.7	23.0	34.4	21 52 6.23	. . . .	..	..	..	. .	. .		
26	22	α Bootis	14.9	26.8	38.0	50.0	1.5	13.3	24.9	14 8 49.91	341 5 36.0	46.0	52.0	44.0	44.50	. .	30.434	52.0
28	23	α Pegasi	46.0	57.1	8.2	19.6	31.0	42.4	53.5	22 57 19.69	335 29 57.5	67.8	71.8	64.9	66.00	. .	30.072	53.0
	24	γ Pegasi	59.4	10.9	22.0	33.3	44.5	56.0	7.5	0 5 33.37	335 26 50.0	58.5	65.0	60.0	58.38	. .	30.058	49.7
	25	β Tauri	11.5	24.1	36.5	49.0	1.5	14.0	26.4	5 16 49.00	349 34 47.7	55.7	62.8	52.8	54.75*d*	. .	30.078	44.3
	26	α Leporis	35.7	47.5	59.0	10.5	21.9	33.5	45.0	5 26 10.44	. . . .	..	..	..	. .	. .		
	27	ε Orionis	5.6	16.8	27.5	38.5	49.3	0.3	11.4	5 28 38.49	319 48 54.3	62.7	75.4	64.0	64.10	. .	30.078	44.3
	28	α Columbæ	38.3	52.0	5.0	18.0	31.3	44.5	58.0	5 34 18.16	287 0 6.8	16.3	25.1	16.5	16.18	. .	30.070	44.0
29	29	Aquarii, 7648, (Mic. 4)	46.5	58.0	9.0	20.2	31.1	43.0	54.0	21 50 20.26	307 40 58.0	66.8	79.1	67.6	67.88	45.404	30.158	52.5
	†30	Neptune, (Mic. 3) .	1.0	12.1	23.3	35.0	46.0	57.2	8.2	21 51 34.69	" " "	"	"	"	"	37.625		
	31	Lacertæ, 7765 . . .	..	2.6	16.5	30.2	44.8	58.8	13.0	22 7 37.65	0 4 4.6	10.5	21.1	8.9	11.28	. .	30.158	52.2
	†32	Moon, 1st and S. L. .	26.2	38.2	49.2	0.5	12.0	23.0	34.1	22 33 0.46	315 27 34.6	45.2	55.8	45.1	45.18	. .	30.160	51.0
	†33	α Piscis Aust. . . .	44.2	57.3	10.0	22.2	35.0	48.0	0.2	22 49 22.41	290 42 55.6	62.8	77.5	63.9	64.95	. .	30.164	50.5
	34	α Pegasi	46.2	57.3	9.0	20.0	31.3	43.0	54.1	22 57 20.13	335 29 53.4	65.8	73.6	61.8	63.65	. .	30.166	50.0
	35	γ Cephei	57.0	46.3	34.0	22.0	9.5	57.0	45.3	23 33 21.59	37 52 32.4	31.2	41.7	54.9	40.05*d*	. .	30.178	49.2
	36	α Andromedæ, (Mic. 4).	4.0	17.0	28.5	41.0	53.8	6.3	18.2	0 0 41.26	349 20 55.3	63.1	70.9	59.8	62.27	41.040	30.176	48.5
	†37	γ Pegasi	59.7	11.3	22.4	33.3	44.8	56.0	7.8	0 5 33.61	335 26 50.2	59.7	68.8	59.5	59.55	. .	30.176	48.2
	†38		10.0								49 34 28.2	28.2	39.9	31.3	31.90	41.413	30.180	47.1
	39										" " "	"	"	"	"	41.248		
	40			15.0							" " "	"	"	"	"	41.083		
	41										" " "	"	"	"	"	40.924		
	42				9.0						" " "	"	"	"	"	40.815		
	43										" " "	"	"	"	"	40.732	30.180	46.2
	44	Polaris				6.0				1 5 4.57	" " "	"	"	"	"	40.714		
	45										" " "	"	"	"	"	40.732		
	46						58.0				" " "	"	"	"	"	40.795		
	47										" " "	"	"	"	"	40.849		
	48							2.0			" " "	"	"	"	"	41.060		
	49										" " "	"	"	"	"	41.222		
	†50								2.0		" " 29.3	30.0	41.1	32.5	33.25	41.382	30.180	45.4
Nov. 10	51	Aquarii, 7648, (Mic. 5)	47.5	58.2	10.0	21.2	32.5	44.0	55.0	21 50 21.20	307 39 9.9	19.0	31.0	17.9	19.45	38.365		
	52	Neptune, (Mic. 3) .	59.0	10.2	21.5	32.2	44.0	55.0	6.2	21 51 32.59	" " "	"	"	"	"	40.340	30.112	66.2

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 22h.	0s.
	s.	s.	s.	s.	
Oct. 24	−0.530	+0.507	+0.022	f 9.203	g .023
25	0.530	0.507	0.022	9.791	.018
26	0.168	0.103	0.351	. . .	.012
28	0.168	0.103	0.351	10.649	.012
29	0.168	0.103	0.351	10.943	g .009
Nov. 10	−0.168	+0.103	+0.351	f 12.075	. .

4, 9. Observation not good. Atmosphere unfavorable during the whole of this evening.
5. Faint and unsteady.
8. Blurred and unsteady.
12. Very unsteady at wire III.
30. Observed for declination at wire V.
32. Observed for declination at 34m. 10s.
33 to 37. Ill defined and unsteady.
38 to 50. Micrometer observations at 44m. 10s., 47m. 38s., 51m. 15s., 54m. 45s., 58m. 16s. 1m. 24s., 5m. 6., 8m. 55s., 11m. 58s , 15m. 34s., 19m. 2s., 22m. 37s., 25m. 52s.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.	
For Inst.	For Obj'ts.		359°59′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.
′ ″	′ ″	° ′ ″	″	s.	m. s.	h. m. s.	° ′ ″	s.	″
− 0 0.01	+ 0 24.76	23 3 10.13	66.32	− 9.18	+ 0 0.47	21 14 56.50	+ 61 56 43.06	+ 2.92	+21.07
. . .	. . .	. . . .	. .	.19	− 0 0.56	21 23 30.29	. . . .	9.31	. .
0 0.01	+ 0 35.13	31 0 11.72	66.31	.19	+ 0 0.92	21 26 42.39	+ 69 53 44.66	0.16	23.32
− 0 0.01	− 0 33.37	330 17 12.97	. .	.19	− 0 0.42	21 36 40.68	+ 9 10 45.91	8.47	35.27
+ 0 0.04	1 15.84	307 33 3.95	. .	.20	0 0.63	21 51 30.53	− 13 33 23.11	. .	. .
−11 43.10	1 16.61	307 21 20.04	. .	.20	0 17.52	21 52 50.46	− 13 45 7.02	9.44	45.13
+ 0 0.01	0 32.32	331 8 42.96	. .	.21	0 0.73	22 33 50.53	+ 10 2 15.90	8.28	44.41
0 0.03	2 34.14	290 40 31.04	. .	.22	0 7.34	22 49 11.07	− 30 25 56.02	9.53	56.90
0 0.00	− 0 26.74	335 29 39.26	. .	.22	0 4.12	22 57 9.58	+ 14 23 12.30	+ 8.09	46.31
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.63	0 20.05	13 5 8.82	. . . .	− 12.94	54.47
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .						
. . .	. . .	. . . .	. .	.77	0 0.22	21 6 26.21	. . . .	+ 7.23	. .
. . .	. . .	. . . .	. .	.78	− 0 0.56	21 23 30.16	. . . .	9.32	. .
0 0.06	+ 0 35.90	31 0 14.36	65.71	.78	+ 0 0.92	21 26 42.13	+ 69 53 47.90	0.22	23.18
+ 0 0.04	− 0 33.46	330 17 15.06	. .	.78	− 0 0.42	21 36 40.56	+ 9 10 48.60	8.48	35.24
. . .	. . .	. . . .	. .	.79	0 0.63	21 50 9.11	. . . .	9.46	+44.65
− 0 0.24	1 15.95	307 32 58.71	. .	.79	0 0.63	21 51 28.71	− 13 33 27.75	. .	. .
. . .	. . .	. . . .	. .	.79	− 0 6.27	21 52 50.17	− 13 45 . .	9.46	. .
0 0.05	0 20.17	341 5 24.28	. .	. .	+ 0 0.24	. . . .	+ 19 58 57.82	9.83	−67.98
− 0 0.02	0 26.47	335 29 39.51	64.26	10.66	0 0.22	22 57 9.25	+ 14 23 14.50	8.14	+46.19
+ 0 0.01	0 26.68	335 26 31.71	. .	.67	0 0.22	0 5 22.92	+ 14 20 6.70	8.15	51.85
− 0 0.08	0 11.06	349 34 43.61	. .	.74	0 0.29	5 16 38.55	+ 28 28 18.60	10.35	18.99
. . .	. . .	. . . .	. .	.74	0 0.17	5 26 59.87	. . . .	7.09	. .
+ 0 0.20	0 50.83	319 48 13.47	. .	.74	0 0.18	5 28 27.93	− 1 17 11.54	8.32	9.38
− 0 0.05	3 14.30	286 57 1.83	. .	.74	0 0.18	5 34 7.60	− 34 9 23.18	5.57	1.67
+ 3 1.69	1 16.25	307 42 53.32	65.90	.94	0 0.17	21 50 9.49	− 13 23 33.33	9.52	44.89
− 7 21.26	− 1 16.56	307 32 30.06	. .	.94	+ 0 0.17	21 51 23.92	− 13 33 56.59	. .	. .
0 0.37	+ 0 0.03	0 4 10.94	. .	.94	− 0 6.69	22 7 20.02	+ 38 57 44.29	6.74	33.59
0 0.23	+56 56.99	316 24 42.17	. .	.95	+ 0 0.18	22 33 57.56	− 4 41 44.48	. .	. .
0 0.33	− 2 35.74	290 40 28.88	. .	.95	0 0.18	22 49 11.64	− 30 25 57.77	9.60	57.57
0 0.01	− 0 27.09	359 29 36.55	. .	.95	0 0.22	22 57 9.41	+ 14 23 9.90	8.15	46.17
− 0 0.05	+ 0 46.33	37 53 26.33	. .	.96	0 1.80	23 33 12.43	+ 76 46 59.68	1.01	45.19
+ 0 31.92	− 0 11.21	349 21 22.98	. .	.96	0 0.29	0 0 30.59	+ 28 14 56.33	8.00	48.97
0 0.00	− 0 27.25	335 26 32.30	. .	.96	0 0.22	0 5 22.87	+ 14 20 5.65	+ 8.16	51.82
0 44.92	+ 0 47.23	49 36 4.72	. .						
0 39.08	0 54.12	5.77	. .						
0 33.40	1 0.01	5.98	. .						
0 27.93	1 4.46	4.96	. .						
0 24.18	1 7.69	4.44	. .						
0 21.32	1 9.43	3.32	. .						
0 20.71	1 10.20	3.48	. .	.97	0 17.10	1 5 10.70	+ 88 29 37.93	− 11.11	53.14
0 21.32	1 9.61	3.50	. .						
0 23.49	1 8.06	4.12	. .						
0 25.35	1 5.00	2.92	. .						
0 32.61	1 0.73	5.91	. .						
0 38.18	0 55.11	5.86	. .						
0 43.69	+ 0 48.57	4.83	. .						
+ 4 46.70	− 1 13.49	307 44 52.64	63.81	− 12.07	0 0.17	21 50 9.30	− 13 23 31.90	+ 9.70	+45.69
− 5 45.03	− 1 13.77	307 33 20.61	. .	.07	+ 0 0.17	21 51 20.69	− 13 34 3.95	. .	. .

NADIR POINTS.				
A.	B.	C.	D.	Means
	Oct.	24,	Night.	° ′ 179 59
63″5	72″9	68″2	60″0	66″15
63.2	73.3	68.6	60.0	66.28
63.3	72.5	68.6	59.5	65.97
63.5	74.2	69.0	60.0	66.68
63.7	74.0	69.1	59.3	66.52
63.44	73.38	68.70	59.76	66.32
	Oct.	25,	Night.	179 59
62.0	72.0	67.0	59.5	65.12
62.5	72.6	67.5	60.3	65.98
62.8	72.5	68.0	60.0	65.82
62.5	72.0	68.8	59.6	65.73
62.8	73.0	68.0	60.0	65.95
62.72	72.42	67.86	59.88	65.72
	Oct.	28,	Night.	179 59
62.0	70.0	65.0	58.0	63.75
62.0	70.0	66.5	58.0	64.12
62.5	71.1	66.6	58.0	64.55
62.3	71.0	67.0	58.5	64.70
62.0	70.0	67.0	58.0	64.25
62.16	70.42	66.42	58.10	64.27
	Oct.	29.		179 59
58.8	67.5	74.0	62.1	65.60
59.5	67.8	74.0	62.4	65.92
60.0	68.2	74.4	62.5	66.28
59.5	67.8	73.9	62.6	65.95
59.6	67.9	73.8	62.2	65.88
59.48	67.84	74.02	62.36	65.93

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	m. s.	′ ″
Moon .	+ 1 7.87	

Oct. 25. Error of Runs, +0″.58.
" 28. do. do. 0.63.
" 29. do. do. +0.94; Mic. coincidence, 40r.112.

Assumed Latitude 38° 53′ 39″.25 North.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THER	
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.	E
			s.	s.	s.	s.	s.	s.	s.	H. M. S.	° ′ ″	″	″	″	″	Revs.	In.	°	
Nov.10	1	ζ Pegasi	29.0	40.1	51.2	2.2	13.1	24.5	35.8	22 34 2.27	331 9 3.8	12.6	21.0	9.0	11.60	. .	30.108	66.0	63
	2	α Pegasi, (Mic. 4) . .	47.1	58.5	10.0	21.1	32.5	43.4	55.0	22 57 21.10	335 28 22.1	32.9	40.0	31.0	31.50d	42.706	30.100	65.8	62
15	3	Polaris	8.5							1 4 59.57	49 35 27.3	26.0	29.0	31.0	28.33	. .	30.190	52.3	46
	4			8.5							16.8	14.7	28.1	19.8	19.85	. .			
	5				2.5						9.8	7.1	22.0	13.0	12.97	. .			
	6					58.0					6.4	5.0	19.3	9.0	9.92	. .	30.192	52.0	51
	7						54.0				8.0	6.2	20.2	10.2	11.15	. .			
	8							54.0			13.0	12.3	25.5	16.0	16.70	. .			
	9								51.5		24.0	22.8	35.7	27.8	27.58	. .	30.192	51.8	45
16	†10	Sun, 1st L. . . .	52.0	4.1	15.3	27.4	38.7	50.5	1.9	15 25 27.13	. . . .	..	..	..	. .	. .			
	11	Sun, 2d L. . . .	9.9	21.6	33.0	44.6	56.0	7.4	19.1	15 27 44.51	. . . .	..	..	..	. .	. .			
	†12	ζ Pegasi	24.0	35.2	46.4	57.7	8.8	20.0	31.0	22 33 57.59	331 9 8.1	16.0	23.2	16.0	15.82	. .	30.180	54.8	47
	†13	α Piscis Aust. . . .	40.2	53.5	5.7	18.5	31.2	44.0	56.6	22 49 18.53	290 42 55.0	62.2	75.5	65.0	64.42	. .	30.180	54.3	46
	†14	α Pegasi	42.7	54.0	5.4	16.4	27.8	39.2	50.4	22 57 16.56	335 29 56.2	67.0	74.0	64.8	65.50	. .	30.180	54.2	47
	†15	γ Cephei	53.0	41.8	29.2	17.3	5.0	52.8	40.8	23 33 17.13	37 52 40.0	39.0	48.5	43.0	42.62	. .	30.186	53.7	47
	16	α Andromedæ . . .	0.5	13.0	25.5	38.8	..	2.8	15.0	0 0 35.93	349 21 29.5	38.0	43.7	37.0	37.05	. .	30.186	53.8	47
	17	α Cassiopeiæ	2.4	22.0	41.8	0.8	20.1	39.9	58.9	0 32 0.84	16 48 11.8	14.6	23.7	14.0	16.02	. .	30.186	52.5	46
	18	α Tauri	43.3	55.0	6.3	17.6	29.1	40.5	51.8	4 27 17.66	337 18 29.8	37.6	45.0	39.1	37.88	. .	30.198	49.0	42
17	†19	γ Cephei	53.0	42.2	30.2	..	5.5	54.1	41.8	23 33 17.80	37 52 34.9	34.3	45.5	37.9	38.15d	. .	30.190	55.5	48
	20	α Andromedæ, (Mic. 4).	0.2	12.8	25.1	38.2	51.0	3.8	15.9	0 0 38.11	349 19 28.0	36.4	43.4	33.4	35.30d	43.483	30.192	55.0	48
	†21	γ Pegasi	57.0	8.2	19.3	31.2	42.0	53.5	4.4	0 5 30.80	335 26 51.0	60.5	64.3	59.1	59.98	. .			
	22	Polaris, (Mic. 4) .	1.0							0 57 59.40	. . . .	..	..	..	. .	. .			
	†23										49 34 28.5	28.4	40.0	32.4	32.32d	41.452	30.196	55.0	47
	24			7.0							" " "	"	"	"	"	41.308			
	25										" " "	"	"	"	"	41.226			
	26				2.0						" " "	"	"	"	"	41.120			
	27										" " "	"	"	"	"	41.110			
	28					57.0					" " "	"	"	"	"	41.039			
	29										" " "	"	"	"	"	41.021			
	†30						50.0				" " "	"	"	"	"	41.088	30.196	55.3	47
	†31	ϑ¹ Ceti	58.8	10.3	21.0	32.0	42.5	54.2	5.0	1 16 31.97	312 8 51.8	63.6	73.0	60.1	62.12	. .	30.190	55.7	46
21	†32	ε Pegasi	18.0	29.7	40.4	51.4	2.5	13.9	24.7	21 36 51.51	330 17 56.8	67.5	75.0	65.0	66.08	. .	29.978	53.5	42
	†33	Neptune	..	23.0	34.1	45.1	56.4	8.0	19.3	21 51 50.98	307 35 1.8	11.2	21.5	13.5	12.00	. .	29.978	53.5	41
	34	ζ Pegasi	28.0	39.3	50.5	1.7	12.9	23.9	35.0	23 34 1.61	331 9 21.9	30.0	37.1	31.0	30.00	. .	29.962	51.0	41.
	35	α Piscis Aust. . . .	44.1	57.0	9.5	22.2	35.2	48.0	9.5	22 49 22.36	290 43 15.0	22.0	33.0	23.5	23.38	. .	29.960	50.2	42.
	36	α Pegasi	46.4	58.0	9.2	20.5	31.5	43.4	54.5	22 57 20.50	335 30 15.0	27.2	32.5	25.5	25.05	. .	29.960	50.0	42.
	†37	β Ceti	31.6	43.4	54.9	6.5	18.3	29.5	41.3	0 36 6.50	302 18 32.5	42.0	53.0	42.0	42.38	. .	29.960	48.0	37.
	†38	Polaris	1.0							1 5 3.29	49 35 44.4	42.1	55.7	49.7	47.98	. .	29.940	48.0	37.
	39			10.0							35.0	34.0	46.0	38.7	38.42	. .			
	40				5.0						28.2	27.2	40.0	31.0	31.60	. .			
	41					6.0					26.2	25.0	37.1	30.6	29.72	. .	29.940	47.3	37.
	42						55.5				27.5	26.0	38.0	31.0	30.62	. .			
	43							0.0			32.7	31.3	43.0	36.1	35.78	. .			
	†44								55.5		44.5	43.4	56.0	48.5	48.10	. .			
	†45	γ Ceti	2.6	13.4	24.3	35.4	46.5	57.3	8.3	2 35 35.40	323 42 36.2	45.0	55.0	48.0	46.05	. .	29.916	45.5	37.
23	46	Aquarii, 7648, (Mic. 5)	49.1	0.2	11.4	22.2	34.0	45.5	56.6	21 50 22.71	. . . .	..	..	..	. .	38.281			
	†47	Neptune, (Mic. 3) .	18.2	29.2	40.0	52.2	3.3	14.7	26.0	20 51 51.94	. . . .	..	..	..	. .	43.250			
30	48	Aquarii, 7648, (Mic. 5)	55.2	6.5	18.0	29.2	40.5	51.5	3.0	21 50 29.13	307 37 31.9	41.1	51.2	38.2	40.60d	41.820			
	49	Neptune, (Mic. 4) .	43.5	55.2	6.2	17.5	28.6	39.5	51.1	21 52 17.37	" " "	"	"	"	"	39.350	30.296	50.4	41.
	50	Lacertæ, 7765 . . .	56.8	11.0	25.2	39.0	53.2	7.2	21.6	22 7 39.14	0 4 26.5	33.2	40.1	29.9	32.42d	. .	30.294	49.7	41.
	51	α Andromedæ . . .	13.0	25.8	38.0	50.3	2.2	15.2	28.0	0 6 50.36	349 20 48.0	58.4	66.3	54.0	56.68	. .	30.304	44.7	36.
	52	γ Pegasi	8.5	20.0	31.7	43.0	54.0	5.6	16.5	0 5 42.76	335 27 13.0	24.8	32.8	21.0	22.90	. .			36.

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	n.	c.	At 0h.	0s.
	s.	s.	s.	s.	
Nov.10	—0.168	+0.103	+0.351	f 12.075	. .
16	0.168	0.103	0.351	7.609	g .032
17	0.168	0.103	0.351	8.154	.032
21	0.168	0.103	0.351	11.589	.032
30	—0.425	+0.089	+0.192	f 19.917	g .032

10, 15. Unsteady.
12, 13, 37. Blurred, and very unsteady.
14. Observed through clouds. At times nearly obscured.
19. Observed through clouds, but observation good.
21, 31, 45. Exceedingly unsteady.
23 to 30. Micrometer observations taken at 47*m.* 46*s.*, 51*m.* 7*s.*, 54*m.* 31*s.*, 58*m.* 2*s.*, 1*m.* 52*s.*, 4*m.* 57*s.*, 8*m.* 27*s.*, and 11*m.* 50*s.*
32. Very unsteady. Poor observation.
33. Transit observation not good. Observation for declination very fair.
38 to 44. Very unsteady and blurred. At wire v, exceedingly unsteady.
47. A differential observation only. Differential refraction, 0″.73, parallax, 0″.23. Observed declination = dec. of the star of comparison —8′ 47″.98.

CORRECTIONS		Corrected Readings.	Zenith Point.	COR. IN Æ.		OBSERVED		REDUCTION TO 1850.0.		NADIR POINTS.				
For Inst.	For Obj'ts.		360°00′	Clock.	Inst.	R. A.	DEC.	R. A.	DEC.	A.	B.	C.	D.	Means
′ ″	′ ″	° ′ ″	″	s.	M. s.	H. M. s.	° ′ ″	s.	″		Nov.	10.		° ′
− 0 0.02	− 0 31.35	331 20 40.42	3.81	− 12.07	+ 0 0.21	22 33 50.41	+ 10 2 15.67	+ 8.50	+44.52					**179 59**
+ 1 29.57	− 0 25.95	335 29 35.12	. .	.07	0 0.21	22 57 9.24	+ 14 23 10.56	+ 8.29	46.07	57″2	66″1	71″0	61″0	63″82
0 0.23	+ 0 46.44	49 36 15.00	. .							57.1	66.2	71.4	60.7	63.85
0 0.30	0 59.09	19.24	. .							57.0	66.2	70.9	61.0	63.78
0 0.39	1 6.63	19.99	. .							56.7	66.0	71.4	60.8	63.72
0 0.36	1 9.37	19.65	5.79	6.88	0 17.10	1 5 9.79	+ 88 29 51.32	− 7.19	47.30	57.0	66.2	71.2	61.1	63.88
0 0.35	1 7.11	18.61	. .							57.00	66.14	71.18	60.92	63.81
0 0.33	0 59.90	16.93	. .											
+ 0 0.24	+ 0 47.78	15.60	. .											
. . .	. . .	. . . .	. .	7.33	0 0.17	15 26 28.66	. . . .	. .	. .					
. . .	. . .	. . . .	. .	. .	0 0.17									
− 0 0.15	− 0 32.49	331 8 43.18	. .	.56	0 0.21	22 33 50.24	+ 10 2 16.64	+ 8.58	44.71		Nov.	16,	Night.	**179 59**
0 0.22	2 34.77	290 40 29.43	. .	.57	0 0.18	22 49 11.14	— 30 25 57.11	9.88	59.71	63.0	72.3	68.0	59.0	65.58
0 0.24	— 0 26.88	335 29 38.38	. .	.58	0 0.22	22 57 9.20	+ 14 23 11.84	8.37	46.16	63.0	73.8	68.0	59.5	66.07
0 0.35	+ 0 45.77	37 53 28.04	. .	.60	0 1.80	23 33 11.33	+ 76 47 1.50	2.15	40.76	63.0	72.6	68.0	59.0	65.65
0 0.12	— 0 11.08	349 21 25.85	. .	.61	0 2.35	0 0 30.67	+ 28 14 59.31	8.09	47.55	63.0	72.9	68.0	60.0	65.98
0 0.05	+ 0 17.83	16 48 33.80	. .	.62	0 0.61	0 32 53.83	+ 55 42 7.26	7.65	46.78	63.0	72.7	68.0	59.5	65.80
0 0.13	— 0 24.92	337 18 12.83	. .	.75	0 0.23	4 27 10.14	+ 16 11 46.29	8.84	27.35					
— 0 0.03	+ 0 45.67	37 53 23.79	5.08	8.14	0 1.82	23 33 11.48	+ 76 46 57.96	2.22	40.56	63.00	72.86	68.00	59.40	65.81
+ 1 56.24	— 0 11.05	349 21 20.49	. .	.15	0 0.29	0 0 30.25	+ 28 14 54.66	8.10	47.50					
0 0.00	— 0 26.93	335 26 33.05	. .	.16	0 0.22	0 5 22.86	+ 14 20 7.22	+ 8.31	51.52					
. . .	. . .	. . . .	. .											
0 46.52	+ 0 53.39	49 36 12.23	. .								Nov.	17.		**179 59**
0 41.42	0 58.85	12.59	. .							57.8	67.5	73.5	60.8	64.90
0 38.60	1 3.15	14.07	. .							58.0	67.3	73.6	60.5	64.85
0 34.96	1 6.40	13.68	. .	.19	7 15.15	1 5 6.36	+ 88 29 47.40	— 6.51	46.81	57.9	67.5	73.9	61.5	65.20
0 34.61	1 8.54	15.47	. .							58.0	67.5	74.1	61.8	65.35
0 32.17	1 9.12	13.61	. .							58.0	67.0	73.9	61.5	65.10
0 31.55	1 8.61	12.48	. .											
+ 0 33.51	+ 1 6.90	12.73	. .							57.94	67.36	73.80	61.22	65.08
0 0.00	— 1 5.05	312 7 57.07	. .	.20	0 0.17	1 16 23.94	— 8 58 28.76	+ 8.06	56.17					
— 0 0.02	0 33.72	330 17 32.34	25.17	11.51	+ 0 0.20	21 36 40.20	+ 9 10 46.42	8.88	36.19					
— 0 0.01	1 16.53	307 33 55.46	. .	.52	— 0 5.47	21 51 33.99	— 13 32 50.46	. .	. .					
+ 0 0.01	0 32.61	331 8 57.40	. .	.54	+ 0 0.21	22 33 50.28	+ 10 2 11.48	8.64	44.93		Nov.	21,	Night.	**180 0**
— 0 0.02	2 35.07	290 40 48.29	. .	.55	0 0.18	22 49 10.59	— 30 25 57.63	9.97	60.19	24.0	32.0	28.0	18.5	25.62
0 0.00	0 27.00	335 29 58.05	. .	.56	0 0.22	22 57 9.16	+ 14 23 12.12	8.44	46.30	23.8	33.0	29.0	20.0	26.45
+ 0 0.01	— 1 34.22	302 17 8.17	. .	.61	0 0.17	0 36 55.06	— 18 49 37.75	+ 8.33	61.67	22.0	30.8	27.0	17.2	24.23
0 0.08	+ 0 46.86	49 36 34.92	. .							22.6	32.0	27.8	18.4	25.20
0 0.13	0 59.82	38.37	. .							22.3	31.0	26.0	18.0	24.33
0 0.18	1 7.37	39.15	. .											
0 0.19	1 10.03	39.94	. .	.62	0 17.10	1 5 8.77	+ 88 29 51.74	— 5.06	45.49	22.94	31.76	27.56	18.42	25.17
0 0.19	1 7.77	38.58	. .											
0 0.15	1 0.38	36.31	. .											
0 0.07	+ 0 48.20	36.37	. .											
0 0.01	— 0 43.80	323 42 2.26	. .	.67	+ 0 0.19	2 35 23.92	+ 2 35 16.34	— 7.98	46.91		Nov.	30.		**180 0**
. . .	. . .	. . . .	. .		. . .	. . . . .	. . . .	+ 9.89	46.50	17.2	26.7	32.7	20.5	24.27
. . .	. . .	. . . .	. .		. . .	. . .	. . . .	. .	. .	17.2	27.2	32.2	20.7	24.33
+ 6 44.11	— 1 17.17	307 43 7.54	24.10	19.85	— 0 0.25	21 50 9.03	— 13 23 37.31	10.00	46.94	17.0	26.5	32.2	20.5	24.05
— 0 26.11	— 1 17.27	307 35 57.22	. .	.85	0 0.25	21 51 57.27	— 13 30 47.63	. .	. .	17.5	27.0	32.0	20.7	24.30
0 0.00	+ 0 0.08	0 4 32.50	. .	.86	0 0.11	22 7 19.17	+ 38 57 47.65	7.39	33.15	17.0	26.5	32.2	20.6	24.08
+ 0 0.01	— 0 11.38	349 20 45.31	. .	.92	0 0.16	0 0 30.28	+ 28 15 0.46	8.26	47.15					
+ 0 0.15	— 0 27.66	335 25 55.39	. .	.92	— 0 0.20	0 5 22.64	+ 14 20 10.54	+ 8.44	+51.78	17.18	26.78	32.26	20.60	24.20

Object.	COR. IN Æ.	Observed Vertical Semi-diameters.
	Semi-diam.	
	M. s.	′ ″

Nov. 10. Error of Runs, . . . Mic. coincidence, 40r10.
" 16. do. do. +0″60.
" 17. do. do. +0.65; do. 40.10.
" 21. do. do. —0.05.
" 23. do. do. . . . do. 40.11.
" 30. do. do. +0.74; do. 40.14.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

DATE. 1846.	No. for ref.	OBJECTS OBSERVED.	TIMES OF TRANSIT OVER WIRES.								CIRCLE & MICROMETER READINGS.						Barometer.	THERS.		Observers.
			I.	II.	III.	IV.	V.	VI.	VII.	Means.	A.	B.	C.	D.	Means	Mic.		At.	Ex.	
			s.	s.	s.	s.	s.	s.	s.	H. M. s.	° ′ ″	″	″	″	″	Revs.	In.	°	°	
Nov. 30	1	α Cassiopeiæ . . .	..	34.5	54.0	13.4	32.8	52.1	..	0 32 13.36	16 48 25.2	29.5	39.1	28.0	30.40	. .				H.
	2	β Ceti	40.8	52.5	3.9	15.2	27.0	38.6	50.0	0 31 15.37	302 17 31.1	40.8	51.3	39.5	40.68	. .	30.314	43.0	35.0	
Dec. 2	3	Aquarii, 7648, (Mic. 4)	57.2	8.0	19.2	30.1	41.3	53.0	4.2	21 50 30.43	307 42 1.2	1.3	6.9	8.0	4.35	43.490				
	4	Neptune, (Mic. 3) .	51.2	3.0	14.0	25.3	36.6	48.0	59.0	21 52 25.30	" " "	"	"	"	"	42.305	30.066	49.0	51.4	
	5	Lacertæ, 7765 . . .	58.5	12.9	26.5	40.3	54.4	9.0	23.0	22 7 40.66	0 4 0.0	5.5	10.2	12.4	7.02	. .				
	6	ζ Pegasi	38.2	49.3	0.5	11.8	22.4	34.0	..	22 34 6.03	331 9 7.2	7.5	10.5	12.0	9.30	. .	30.036	50.0	50.7	
	†7	α Piscis Aust. . . .	54.5	7.2	19.8	32.2	45.0	58.2	10.8	22 49 32.53	290 42 51.1	49.0	58.5	59.0	54.40	. .	30.036	50.0	50.6	
	8	α Pegasi	..	8.0	19.2	30.5	41.5	53.1	43.0	22 57 36.10	235 29 57.2	61.0	62.0	63.7	61.00	. .	30.040	50.2	50.5	
4	†9	γ Cephei	7.5	55.0	42.7	31.5	19.3	..	54.0	22 33 15.99	37 52 42.6	32.6	37.6	47.0	39.95*d*	. .	30.306	47.2	39.2	M.
	†10	β Ceti	42.2	54.0	5.7	17.3	28.7	40.5	52.1	0 36 17.21	302 18 16.0	16.2	20.0	23.3	18.88	. .	30.330	45.8	36.0	
	†11	α Arietis	21.5	33.7	45.5	57.5	9.3	21.2	32.8	1 58 57.36	343 50 53.0	53.0	55.0	66.5	56.88	. .	30.352	43.0	33.1	
9	12	u Piscis Aust. . . .	57.0	10.1	22.6	35.5	48.0	0.8	13.4	22 49 35.34	290 42 55.3	52.8	62.0	63.6	58.42	. .				
	13	α Pegasi	59.5	10.9	22.1	33.4	44.6	56.0	7.4	22 57 33.41	335 29 55.2	58.3	58.7	64.6	59.20	. .	30.034	47.0	40.7	
	14	γ Cephei	9.3	57.5	45.1	33.0	20.6	8.8	56.5	23 33 32.97	37 52 44.7	34.2	39.5	48.0	41.59*d*	. .	30.040	46.0	39.1	
	15	α Andromedæ . . .	17.4	30.1	42.1	54.5	7.0	19.6	31.9	0 0 54.69	349 21 28.0	28.2	28.0	35.0	29.80	. .	30.040	45.7	38.2	
	†16	γ Pegasi	13.1	24.5	35.6	47.0	58.0	9.6	21.0	0 5 46.97	335 26 52.0	51.2	54.5	63.8	55.38	. .	30.040	45.0	38.0	
	†17	β Ceti	44.7	55.9	7.7	19.3	31.0	42.5	54.0	0 36 19.30	302 18 12.0	11.3	16.0	21.0	15.08	. .	30.054	44.6	37.0	
	18	Polaris	13.5								49 35 30.3	21.0	27.3	34.8	28.28	. .	30.042	44.5	36.8	
	19			16.5							35 20.0	9.7	16.4	22.8	17.22	. .				
	20				11.0						13.0	2.5	8.5	14.8	9.70	. .				
	21					9.0				1 5 8.93	34 70.0	58.5	66.6	72.0	66.78	. .	30.064	44.1	36.0	
	22						5.5				35 11.8	1.2	9.0	14.3	9.08	. .				
	23							5.5			17.5	7.8	14.3	19.5	14.78	. .				
	24								1.5		27.7	18.7	24.2	33.0	25.92	. .	30.072	44.0	35.3	
	†25	γ^1 Eridani	45.8	57.0	8.3	19.5	30.7	42.0	53.6	3 51 19.56	307 10 41.2	42.5	44.6	55.0	45.82	. .	30.098	41.7	35.0	
	†26	Jupiter, 1st and N. L.	52.0	3.5	15.8	27.7	39.5	51.2	2.8	4 37 27.49	342 28 2.0	5.0	8.0	13.6	7.15	. .	30.082	40.5	31.1	
12	27	ϑ^1 Ceti	16.6	28.0	38.8	50.0	0.8	11.9	22.9	1 16 49.86	312 9 6.0	6.7	10.8	15.0	9.62	. .	30.130	40.5	34.0	
	†28	γ Ceti	17.5	28.5	39.5	50.5	1.4	12.3	23.3	2 36 50.43	323 42 28.1	27.6	31.5	40.5	31.92	. .	30.126	41.5	32.6	
	†29	α Ceti	12.3	22.9	34.0	44.6	55.9	6.8	17.7	2 54 44.89	324 36 20.6	20.7	24.1	32.3	24.42	. .	30.122	41.0	31.8	
	30	γ^1 Eridani	47.4	58.9	10.1	21.4	32.5	43.9	55.2	3 51 21.34	307 10 51.0	53.0	56.2	61.8	55.50	. .	30.110	39.2	32.4	
	31	α Tauri	2.4	14.2	25.5	46.6	48.2	59.9	11.7	4 27 36.85	337 18 40.0	40.8	42.5	50.7	43.50	. .	30.104	38.2	32.1	
19	32	β Ceti	51.3	3.3	14.6	26.8	37.9	49.4	0.7	0 36 26.21	302 18 12.0	13.8	18.8	22.0	16.65	. .	29.700	42.3	34.7	
	†33	Polaris	9.5								49 35 37.1	26.6	35.0	42.0	35.18	. .	29.700	42.1	34.6	
	34			14.0							26.5	17.1	24.5	30.5	24.65	. .				
	35				10.5						19.8	10.3	18.0	22.5	17.65	. .				
	36					13.0				1 5 11.29	17.7	7.5	15.6	20.0	15.20	. .	29.696	41.0	34.4	
	37						11.0				18.2	11.0	22.5	18.3	17.50	. .				
	38							14.0			26.0	16.8	25.0	29.9	24.42	. .				
	†39								7.0		37.0	28.4	35.3	42.1	35.70	. .	29.698	40.7	34.7	
26	†40	Sun, 1st and N. L. .	58.0	10.2	22.0	34.0	46.1	58.0	9.9	18 19 34.03	298 1 61.9	47.6	53.0	56.0	54.62	. .	30.258	41.0	41.7	
	41	Sun, 2d L.	20.8	32.8	44.5	56.6	8.3	20.5	32.2	18 21 56.53	. . . .	..	..	..	..	. .				
	†42	α Lyræ	37.5	51.4	5.4	19.5	33.4	47.4	1.5	18 32 19.44	359 46 18.6	18.0	10.0	24.0	17.65	. .	30.258	41.2	41.5	
	†43	α Aquilæ	20.4	31.7	42.6	53.7	4.9	15.9	26.8	19 43 53.71	329 35 18.2	20.8	12.0	25.8	19.20	. .	30.236	42.0	41.6	
	44	γ Pegasi	23.9	35.3	46.5	57.8	9.1	20.3	31.8	0 5 57.81	335 26 57.2	58.7	50.0	69.0	58.72	. .	30.202	42.7	38.0	
	45	β Ceti	55.5	7.2	18.8	30.4	41.7	53.5	5.0	0 36 30.30	302 18 13.0	15.0	9.0	24.0	15.25	. .	30.182	42.3	35.6	
	46	Polaris		14.0							49 35 26.0	17.8	15.0	33.2	23.00	. .	30.182	42.2	36.3	
	47				13.5						20.3	10.0	8.2	25.2	15.92	. .				
	48					13.0				1 6 34.56	18.0	9.7	7.2	24.8	14.92	. .	30.172	41.8	36.6	
	49						7.3				20.0	10.2	8.5	25.5	16.05	. .				
	50								5.0		36.6	27.8	23.8	43.0	32.80	. .	30.172	41.4	36.0	
	51	Moon, 1st and S. L. .	14.5	26.4	37.6	48.8	0.4	11.6	23.1	1 40 48.91	27.0	28.2	19.0	38.5	28.18	. .	30.162	41.2	36.2	
	52	γ Ceti	26.5	37.6	48.5	59.5	10.3	21.4	32.5	2 35 59.47	323 42 18.8	19.8	14.5	31.5	21.15	. .	30.124	40.0	35.5	

DATE.	VALUE OF			CLOCK.	H. Rate.
	m.	*n.*	*c.*	At 0*h.*	0*s.*
	s.	s.	s.	s.	
Nov. 30	−0.425	+0.089	+0.192	*f* 19.917	*g* .032
Dec. 2	0.425	0.089	0.192	21.401	.026
4	0.425	0.089	0.192	22.074	.024
9	0.425	0.089	0.192	24.483	.021
12	0.425	0.089	0.192	26.050	.026
19	0.425	0.089	0.192	31.193	.028
26	−0.425	+0.089	+0.192	*f* 35.364	*g* .023

7. Exceedingly ill defined.
9, 10, 11, 16, 17, 28, 29, 43. Blurred and unsteady.
25. Observation very bad.
26, 40. Unsteady and badly defined.
33 to 39. Very unsteady. At wires VI and VII, hardly visible. Observation unsatisfactory.
42. Unsteady.

CORRECTIONS For Inst.	CORRECTIONS For Obj'ts.	Corrected Readings.	Zenith Point. 360°00′	COR. IN Æ. Clock.	COR. IN Æ. Inst.	OBSERVED R. A.	OBSERVED DEC.	REDUCTION TO 1850.0. R. A.	REDUCTION TO 1850.0. DEC.
′ ″	′ ″	° ′ ″	″	s.	M. s.	H. M. s.	° ′ ″	s.	″
+ 0 0.12	+ 0 18.29	16 48 48.81	24.10	− 19.93	+ 0 0.04	0 31 53.47	+ 55 42 3.96	+ 7.92	+43.27
− 0 0.17	− 1 35.68	302 16 4.83	. .	.93	− 0 0.25	0 35 55.19	− 18 49 40.02	8.45	62.84
+ 1 56.13	1 15.14	307 42 45 34	1.25	21.32	0 0.25	21 50 8.86	− 13 23 36.66	10.01	47.01
− 4 39.95	− 1 15.21	307 35 9.19	. .	.32	0 0.25	21 50 3.73	− 13 30 12.81	. .	. .
0 0.06	+ 0 0.83	0 4 7.79	. .	.35	+ 0 0.11	22 7 19.20	+ 38 57 45.79	7.43	33.28
0 0.01	− 0 32.39	331 8 37.20	. .	.36	+ 0 5.34	22 34 50.01	+ 10 2 15.20	8.79	45.59
0 0.05	2 32.89	290 40 21.46	. .	.37	− 0 0.26	22 49 10.90	− 30 26 0.54	10.14	61.03
0 0.00	− 0 26.57	335 29 34.43	. .	.37	− 0 5.86	22 57 8.87	+ 14 23 12.43	8.58	46.81
0 0.04	+ 0 46.79	37 53 26.70	0.98	22.06	+ 0 16.76	23 33 10.69	+ 76 47 4.97	3.54	38.00
0 0.00	− 1 35.61	302 16 43.27	. .	.08	− 0 0.25	0 35 54.88	− 18 49 38.46	8.47	63.32
0 0.00	0 17.58	343 50 39.30	. .	.12	0 0.18	1 58 35.06	+ 22 44 17.57	8.62	47.43
0 0.00	2 36.08	290 40 22.34	0.76	24.46	0 0.26	22 49 10.62	− 30 25 59.17	10.25	61.40
0 0.00	− 0 27.10	335 29 32.10	. .	.46	− 0 0.20	22 57 8.75	+ 14 23 10.59	8.68	47.28
0 0.01	+ 0 46.39	37 53 27.97	. .	.47	+ 0 0.77	23 33 9.24	+ 76 47 6.24	3.87	37.65
0 0.02	− 0 11.23	349 21 18.55	. .	.48	− 0 0.16	0 0 30.05	+ 28 14 57.04	8.39	47.22
0 0.00	0 27.42	335 26 27.96	. .	.48	0 0.20	0 5 22.29	+ 14 20 6.45	8.53	52.10
− 0 0.01	− 1 34.59	302 16 40.48	. .	.49	− 0 0.17	0 36 54.64	− 18 49 41.03	8.53	63.90
+ 0 0.11	+ 0 47.51	49 36 15.90	. .						
0 0.24	1 0.21	17.67	. .						
0 0.29	1 7.86	17.85	. .						
0 0.30	1 10.47	17.55	. .	.50	+ 0 10.30	1 4 54.73	+ 88 29 55.22	5.32	40.67
0 0.29	1 8.13	17.50	. .						
0 0.25	1 0.90	15.93	. .						
0 0.11	+ 0 48.66	14.69	. .						
0 0.07	− 1 19.35	307 9 26.54	. .	56	− 0 0.25	3 50 54.75	− 13 56 54.97	6.94	38.53
+ 0 0.06	0 41.15	342 27 26.06	. .	.58	0 0.18	4 37 4.47	+ 21 21 4.55	. .	. .
− 0 0.01	1 6.74	312 8 2.87	13.70	26.08	0 0.24	1 16 23.54	− 8 58 31.58	8.25	59.68
0 0.06	0 44.52	323 41 47.34	. .	.12	0 0.23	2 36 24.08	+ 2 35 12.89	8.00	48.65
− 0 0.04	0 43.15	324 35 41.23	. .	.13	0 0.23	2 54 18.53	+ 3 29 6.78	8.00	46.07
+ 0 0.11	1 19.82	307 9 35.79	. .	.15	0 0.20	3 51 54.99	− 13 56 58.66	6.94	39.08
− 0 0.08	0 25.37	337 18 18.05	. .	.17	0 0.19	4 27 10.49	+ 16 11 43.60	8.56	28.00
0 0.00	− 1 33.91	302 16 42.74	7.75	31.21	− 0 0.25	. . . .	− 18 49 45.76	8.66	64.91
+ 0 0.14	+ 0 46.86	49 36 22.18	. .						
0 0.21	0 59.63	24.49	. .						
0 0.25	1 7.23	25.13	. .						
0 0.26	1 9.86	25.32	. .	.22	+ 0 10.30	1 4 50.37	+ 88 29 55.86	11.94	+38.78
0 0.25	1 7.44	25.19	. .						
0 0.21	0 59.96	24.59	. .						
0 0.14	+ 0 47.76	23.60	. .						
+ 0 0.01	−18 1.85	297 37 52.78	6.06	35.23	− 0 0.17	18 20 9.88	+ 23 22 34.03	. .	. .
. . .	. . .			.23	0 0.17				
− 0 0.01	0 0.24	359 45 17.40	. .	.24	0 0.11	18 31 44.09	+ 38 38 50.59	7.49	− 0.38
+ 0 0.02	0 35.08	329 34 44.14	. .	.27	0 0.22	19 43 18.22	+ 8 28 17.13	9.65	+17.69
0 0.00	0 27.47	335 26 31.25	4.74	.36	0 0.20	0 5 22.25	+ 14 20 5.76	8.76	53.28
0 0.00	− 1 35.32	302 16 39.92	. .	.38	0 0.25	0 35 54.67	− 18 49 45.57	8.75	65.47
0 0.16	+ 1 0.58	49 36 23.74	. .						
0 0.19	1 8.15	24.26	. .						
0 0.19	1 10.66	25.77	. .	.39	1 13.63	1 4 45.54	+ 88 29 58.47	17.61	37.81
0 0.19	1 8.17	24.41	. .						
0 0.11	+ 0 48.69	21.60	. .						
. . .	. . .	. . . . .	. .	.40	0 0.22	1 41 20.28	. . . . .	. .	. .
+ 0 0.01	− 0 44.28	323 41 36.88	. .	− 35.42	− 0 0.23	2 35 23.82	+ 2 35 11.39	+ 8.10	+48.85

NADIR POINTS. A.	B.	C.	D.	Means
	Dec. 2.			° ′ **179 59**
60″5	60″4	62″0	62″5	61″35
60.2	59.8	62.1	63.0	61.28
60.0	60.0	62.1	62.8	61.22
60.0	59.7	62.2	62.8	61.20
59.9	59.8	62.1	63.0	61.20
60.12	59.94	62.10	62.84	61.25
	Dec. 4.			**179 59**
65.0	60.0	60.5	60.0	61.38
64.3	59.5	59.2	59.4	60.60
64.1	59.4	59.7	59.4	60.65
65.0	60.0	59.6	60.0	61.15
64.5	60.0	60.0	60.0	61.12
64.58	59.78	59.80	59.76	60.98
	Dec 9.			**179 59**
64.2	61.2	61.0	61.2	61.90
64.8	60.3	60.8	60.0	61.48
64.0	60.0	59.7	59.0	60.67
63.0	58.3	58.0	57.5	59.20
64.0	60.0	59.1	59.2	60.58
64.00	59.96	59.72	59.38	60.76
	Dec.12			**180 0**
17.0	11.0	13.0	13.2	13.55
17.0	11.0	12.7	12.8	13.38
18.0	12.2	12.6	13.0	13.95
18.0	12.2	12.0	12.8	13.75
18.0	12.2	12.5	12.8	13.75
17.60	11.72	12.56	12.92	13.70
	Dec.19			**179 59**
70.0	67.5	67.0	65.2	67.42
71.3	67.0	68.0	66.0	68.08
70.0	66.0	67.2	65.2	67.10
71.0	67.0	67.2	65.8	67.75
71.3	68.0	68.0	66.3	68.40
70.72	67.10	67.48	65.70	67.75
	Dec.26	Day.		**179 59**
74.0	57.0	69.0	67.0	66.75
73.5	56.5	67.0	66.2	65.80
73.0	57.0	67.0	66.0	65.75
73.5	56.0	68.7	66.5	66.18
73.0	57.0	67.3	66.0	65.82
73.40	56.70	67.80	66.34	66.06
	Dec.26	Night.		**179 59**
72.0	55.0	65.9	65.2	64.32
72.5	55.0	66.8	65.3	64.90
72.4	55.2	66.0	64.8	64.60
72.5	56.0	66.2	65.3	65.00
72.3	55.3	66.0	65.1	64.68
72.34	55.30	66.18	65.14	64.74

Object.	COR. IN Æ. Semi-diam.	Observed Vertical Semi-diameters.
	M. s.	″
Jupiter .	+ 0 1.74	

Dec. 1. Adjusted microscopes and nadir point.
" 2. Error of Runs, +0″15; Mic coincidence, 40r.115.
" 9. do. do. 0.15.
" 12. do. do. 0.32.
" 26. do. do. +0.12.

ASSUMED LATITUDE 38° 53′ 39″.25 NORTH.

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OBSERVATIONS

WITH THE

PRIME VERTICAL TRANSIT INSTRUMENT,

1846.

NATIONAL OBSERVATORY.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVEB					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. S.	s.	s.	s.	s.	s.	s.		s.	s.	s.	s.	s.	s.
Jan. 13	1	Bessel's Zone, 448 . .	E.	S.	2 55 12.2	38.0	5.0	31.8	57.0	24.0	51.0	N.	38.0	6.4	34.2	1.8	29.7	59.0
	2		W.	N.	4 57 50.8	20.0	48.8	18.0	45.0	12.0	41.0	S.	27.8	55.0	21.2	47.0	13.5	41.0
	†3	Bessel's Zone, 448 . .	E.	N.	3 18 18.0	1.0	46.0	32.0	18.0	5.5	52.0	S.	28.5	23.0	21.0	20.0	21.0	24.0
	4		W.	S.	4 21 23.0	30.0	34.0	36.5	35.5	32.0	26.5	N.	1.0	47.3	34.5	22.0	7.0	53.0
	†5	Bessel's Zone, 448 . .	E.	N.	3 18 32.5	16.0	1.0	47.0	34.0	20.5	8.5	S.	48.5	43.5	38.0	38.0	41.0	45.0
	6		W.	S.	4 20 58.0	7.0	14.0	16.5	14.5	11.0	8.0	N.	44.0	32.0	18.0	4.5	50.0	37.5
	7	Aurigæ, (1530) . . .	E.	S.	4 3 54.0	18.5	43.0	7.6	30.0	54.6	19.0	N.	55.5	20.7	47.0	10.5	36.2	2.5
	8		W.	N.	6 19 40.8	6.5	32.0	58.0	23.0	47.8	13.7	S.	50.0	14.3	39.0	2.0	25.1	51.0
	9	α² Geminorum	E.	S.	5 14 21.0	42.0	3.8	13.8	24.8	35.8	46.0	N.	12.2	22.5	33.6	45.0	56.0	17.0
	10		W.	N.	10 23 27.0	48.5	9.5	20.2	31.5	42.8	53.0	S.	19.4	29.1	40.5	51.4	2.0	23.1
	11	Aurigæ, (2416) . . .	E.	N.	6 12 35.0	54.5	14.2	35.0	53.3	13.2	32.7	S.	56.2	16.5	36.2	56.8	17.7	38.8
	12		W.	S.	8 58 4.0	25.0	46.0	5.2	26.0	46.0	6.0	N.	31.0	50.0	9.5	29.0	48.0	8.0
	†13	α Bootis	E.	S.	10 20 41.5	55.2	9.0	15.4	22.5	29.5	..	N.	∴	38.0	45.0	52.0	58.8	12.0
	14		W.	N.	18 46 22.5	36.0	50.0	56.6	4.0	11.2	..	S.	..	18.0	25.0	32.0	39.0	53.0
	†15	α Lyræ*	E.	S.	18 20 47.6	33.9	22.0	11.0	57.2	47.6	38.8	N.	10.9	11.0	12.5	13.6	22.8	34.0
	16		W.	N.	19 20 12.0	24.8	35.9	43.2	46.5	46.5	47.0	S.	16.8	9.0	58.4	44.8	34.6	21.3
14	†17	α Lyræ†	E.	N.	18 20 45.0	31.5	18.3	5.8	53.0	42.5	33.0	S.	24.0	23.3	24.5	27.3	34.5	45.2
	18		W.	S.	19 20 0.5	15.6	25.8	34.0	38.0	38.5	36.0	N.	32.0	21.2	10.0	58.8	45.7	33.0
18	19	Persei, (871)	E.	N.	1 57 3.0	27.0	51.6	15.7	39.8	3.3	27.6	S.	10.2	35.0	0.5	26.0	51.5	17.5
	20		W.	S.	4 11 3.0	29.5	55.7	21.2	46.0	11.6	36.8	N.	19.0	43.3	7.1	31.0	54.7	19.0
	21	ξ Persei	E.	S.	2 19 42.0	57.0	11.5	26.3	40.5	54.8	9.8	N.	7.5	22.0	36.8	51.0	6.2	21.4
	22		W.	N.	6 7 24.2	38.8	54.0	9.0	23.5	37.8	53.3	S.	51.0	6.0	21.0	34.2	49.0	4.4
	23	Bessel's Zone, 448 . .	E.	N.	2 55 27.5	54.0	20.5	47.2	13.2	39.2	6.0	S.	58.0	24.5	51.6	19.8	48.2	16.8
	24		W.	S.	4 58 3.2	32.6	1.0	30.0	58.0	25.0	51.5	N.	44.2	11.0	37.0	3.3	29.7	56.0
	†25	Bessel's Zone, 448 . .	E.	S.	3 18 38.5	22.0	9.0	55.5	38.8	26.2	18.0	N.	38.8	36.0	34.5	31.0	35.0	41.0
	26		W.	N.	4 21 37.2	45.0	51.4	54.5	52.0	49.0	45.0	S.	10.0	0.2	48.5	33.5	20.5	6.0
	†27	Bessel's Zone, 448 . .	E.	S.	3 18 52.0	37.5	24.0	9.0	55.0	43.0	33.5	N.	57.0	56.0	53.0	51.0	55.0	2.0
	28		W.	N.	4 21 13.0	20.0	27.0	31.0	30.0	28.0	25.0	S.	53.0	44.0	32.0	16.4	4.0	49.0
	29	Aurigæ, (1530) . . .	E.	N.	4 4 9.8	33.6	58.0	22.2	45.0	9.3	32.7	S.	15.0	39.0	4.5	28.3	54.0	20.2
	30		W.	S.	6 19 54.2	20.0	46.0	11.0	36.4	1.0	26.0	N.	7.5	31.0	54.8	19.0	42.0	6.0
	†31	α Lyræ‡	E.	N.	18 20 57.5	43.5	31.2	18.7	6.0	55.3	45.4	S.	36.7	35.2	35.0	38.8	45.2	57.0
	32		W.	S.	19 20 14.5	29.0	41.0	47.5	51.0	51.0	49.0	N.	43.3	33.0	22.0	10.0	57.5	44.0
19	†33	Persei, (1123)	E.	N.	2 33 5.0	25.5	45.2	5.5	25.0	45.0	4.6	S.	29.0	49.2	9.5	30.0	51.0	12.0
	34		W.	S.	5 16 52.0	13.7	34.8	55.2	15.8	36.0	56.4	N.	20.5	40.8	0.6	20.0	40.2	0.0
	35	μ Aurigæ	E.	S.	4 37 42.8	14.0	49.0	23.0	55.3	29.0	2.5	N.	22.8	59.0	36.2	11.0	51.0	31.7
	36		W.	N.	6 11 49.2	29.0	8.0	46.2	22.6	0.0	38.0	S.	54.0	29.2	2.7	35.2	9.0	43.5
21	37	α Lyræ	E.	S.	18 21 11.6	58.0	45.8	35.0	21.7	12.0	3.6	N.	34.0	32.5	34.5	35.0	44.2	54.5
	38		W.	N.	19 20 39.2	53.5	4.0	12.8	14.0	15.0	15.0	S.	43.5	35.0	25.3	13.0	1.0	48.8
22	39	α Andromedæ	E.	S.	21 12 25.0	42.3	59.5	8.2	16.5	26.0	34.0	N.	42.5	51.2	0.0	9.0	18.0	35.0
	40		W.	N.	3 38 26.5	44.0	1.0	9.8	19.0	28.0	36.2	S.	45.0	54.0	2.8	11.0	20.0	37.0
	†41	Persei, (871)	E.	N.	1 57 15.6	40.0	4.4	28.0	52.6	16.4	40.0	S.	24.1	49.0	13.5	39.5	5.1	31.5
	42		W.	S.	4 11 17.8	44.0	9.7	36.0	0.5	25.6	50.7	N.	35.8	0.0	23.5	47.5	11.6	35.5

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Jan. 13	+1.086	g 0.160
14	1.086	0.134
18	1.086	0.155
19	1.086	0.165
21	1.086	0.146
22	+1.086	g 0.146

	EXTRA WIRES. EAST. 1.					EAST. 2.		WEST. 1.					
			h.	m.	s.	m.	s.			h.	m.	s.	m.
* α Lyræ over extra wires, 1 & 2	Tel.	S.	18	17	54.2	19	20.8	Tel.	N.	19	14	25.5	17
	"	N.	18	41	32.6	38	24.6	"	S.	19	38	1.4	36
† " " " " . .	"	N.	18	17	54.0	19	18.6	"	S.	19	14	13.5	17
	"	S.	18	41	48.0	38	39.0	"	N.	19	38	11.2	36
‡ " " " " . .	"	N.	18	18	4.7	19	31.3	"	S.	19	14	24.0	17
	"	S.	18	42	0.0	38	50.6	"	N.	19	38	23.0	36

	LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
	Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
	N.	S.	Div.	″	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	S.	″			
1 2	31.59 32.95	33.37 33.96	+ 1.78 1.01	+0.73	4 0 9.47	—26 12.47	— 1.19	3 33 55.81	37 52 50.53	+13.37	+41.96	H.	8	Bessel's Zone, 448.
3 4	31.95 32.27	33.20 33.96	1.25 1.69	0.77	3 56 57.10	26 12.54	0.98	3 30 43.58	38 36 54.75	13.42	42.42	H.	8	Bessel's Zone, 448.
5 6	31.95 32.27	33.20 33.96	1.25 1.69	0.77	3 56 56.57	26 12.54	0.98	3 30 43.05	38 37 13.01	13.42	42.42	H.	9	Bessel's Zone, 448.
7 8	32.27 33.55	33.96 34.70	1.69 1.15	0.76	5 15 4.48	26 12.71	1.15	4 48 50.62	37 39 4.81	13.61	+24.21	H.	5	Aurigæ, (1530.)
9 0	33.02 34.85	34.05 36.15	1.03 1.30	0.61	7 51 2.68	26 13.11	1.07	7 24 48.50	32 13 0.77	12.85	—17.95	H.	2.3	α² Geminorum.
1 2	33.52 34.55	34.74 36.22	1.22 1.67	0.76	7 38 1.46	26 13.08	1.04	7 11 47.34	37 2 28.25	13.37	14.31	H.	5	Aurigæ, (2416.)
3 4	34.70 31.20	36.24 33.62	1.54 2.42	1.04	14 34 54.07	26 14.09	1.07	14 8 38.91	19 59 1.57	10.51	—64.64	H.	1	α Bootis.
15 16	32.12 30.09	34.51 32.72	2.39 2.63	1.32	18 57 58.52	26 14.77	1.02	18 31 42.53	38 38 39.66	9.17	+10.10	M.	1	α Lyræ.
17 18	31.69 29.80	33.90 32.18	2.21 + 2.38	+1.20	18 58 1.42	26 18.06	1.04	18 31 42.32	38 38 39.44	9.15	10.41	H.	1	α Lyræ.
19 20	36.95 37.15	35.80 36.35	— 1.15 0.80	—0.51	3 7 23.34	26 27.45	1.04	2 40 54.85	37 40 59.65	13.12	52.18	H.	4.5	Persei, (871.)
21 22	36.65 37.60	35.87 35.95	0.78 1.65	0.64	4 15 30.26	26 27.67	1.14	3 49 1.45	35 20 39.02	13.27	39.15	H.	5	ξ Persei.
23 24	36.90 37.05	35.60 36.00	1.30 1.05	0.62	4 0 24.91	26 27.62	1.05	3 33 56.24	37 52 51.24	13.49	42.26	H.	8	Bessel's Zone, 448.
25 26	36.90 37.15	35.60 36.35	1.30 0.80	0.55	3 57 13.47	26 27.62	0.96	3 30 44.89	38 36 55.34	13.44	41.77	H.	8	Bessel's Zone, 448.
27 28	36.90 37.15	35.60 36.35	1.30 0.80	0.55	3 57 12.32	26 27.62	0.96	3 30 43.74	38 37 14.07	13.44	41.77	H.	9	Bessel's Zone, 448.
29 30	37.00 37.50	36.25 36.38	0.75 — 1.12	—0.49	5 15 20.09	26 27.86	1.13	4 48 51.10	37 39 5.15	13.65	23.81	H.	5	Aurigæ, (1530.)
1 2	36.60 34.29	37.78 36.47	+ 1.18 2.18	+0.88	18 58 13.48	26 30.38	0.82	18 31 42.28	38 38 39.06	9.06	11.58	H.	1	α Lyræ.
	34.47 34.80	35.97 37.19	1.50 2.39	1.02	3 57 42.71	26 32.20	1.00	3 31 9.51	37 4 46.47	13.37	42.59	H.	6	Persei, (1123.)
	34.70 35.40	37.00 37.25	2.30 1.85	1.09	5 29 29.26	26 32.41	1.16	5 2 55.69	38 17 44.14	13.75	19.94	H.	5	μ Aurigæ.
	32.82 31.98	34.90 34.10	2.08 2.12	1.10	18 58 23.80	26 40.74	1.07	18 31 41.99	38 38 37.27	9.01	12.46	H.	1	α Lyræ.
	31.30 33.05	33.33 35.35	2.03 2.30	1.14	0 27 9.59	26 41.68	1.00	0 0 26.91	28 14 35.30	11.86	69.02	H.	1	α Andromedæ.
	32.53 33.57	34.65 35.26	2.12 + 1.69	+1.00	3 7 37.70	—26 42.04	— 1.14	2 40 54.52	37 40 58.71	+13.20	+52.27	H.	4.5	Persei, (871.)

3. Number of small stars visible in dark field. 3 & 5. Observed at same time.
13. Over extra wires. Hazy; star very dim in the west.
15. Windy; clear, pale, blue sky. Telescope sometimes shaken by gusts of wind, as on wires B and C.
17. Hazy; star indistinct, but steady.
23. Wire G rejected in the reduction.
25 & 27. Observed at same time. Latter star faint; can scarcely be observed.
31. Tremulous.
33. Star of 7th magnitude in the field.
41. Ground covered with snow; stars steady and well conditioned; good night for observing.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES. A.	B.	C.	D.	E.	F.	G.	Telescope.	TIMES OF TRANSIT OVER W G.	F.	E.	D.	C.	B.
					H. M. S.	s.	s.	s.	s.	s.	s.		s.	s.	s.	s.	s.	s.
Feb. 4	†1	α Lyræ	E.	N.	18 21 49.8	35.8	22.2	10.5	57.5	46.0	35.0	S.	27.0	25.5	26.0	29.2	35.0	46.0
	2		W.	S.	19 21 17.6	32.0	42.0	50.0	53.0	53.0	51.6	N.	44.0	33.2	22.2	9.6	57.8	44.2
9	†3	Persei, (1269)	E.	S.	3 14 25.8	50.5	15.0	38.8	2.0	26.0	50.2	N.	24.7	49.6	15.0	39.1	4.9	30.6
	4		W.	N.	5 31 13.5	39.0	4.5	31.0	55.0	19.8	45.0	S.	19.5	44.0	8.5	31.0	55.2	19.1
	†5	Bessel's Zone, 448	E.	S.	3 57 ..	31.7	59.0	27.0	54.0	22.0	50.5	N.	41.5	11.1	41.0	9.8	40.0	11.0
	6		W.	N.	5 54 ..	2.5	32.0	2.7	32.5	1.8	31.2	S.	22.3	51.0	19.0	46.1	14.0	41.8
	7	Aurigæ, (1935)	E.	S.	5 19 40.5	8.0	35.0	3.7	29.5	57.3	25.8	N.	15.0	44.5	13.8	43.0	13.4	43.2
	8		W.	N.	7 17 12.0	42.5	13.0	43.5	11.8	41.5	10.6	S.	1.0	29.0	57.0	23.0	52.0	19.0
	9	Aurigæ, (2139)	E.	S.	6 15 ..	..	..	..	25.8	10.0	56.0	N.	59.0	50.4	41.6	..	..	..
	10		W.	N.	7 25 ..	..	..	..	40.2	32.0	23.0	S.	27.0	12.0	57.0	..	..	..
	11	α Lyræ	E.	S.	18 22 9.5	56.4	44.0	33.0	20.5	9.5	0.3	N.	31.5	31.2	33.0	34.8	42.4	53.3
	12		W.	N.	19 21 50.0	3.0	13.0	21.0	22.0	23.0	21.8	S.	51.5	43.0	33.0	19.7	9.0	56.0
12†	13	Anonymous	E.	N.	4 11 52.2	33.7	16.0	58.0	39.6	23.2	6.5	S.	27.5	18.0	7.0	59.0	53.0	50.0
	14		W.	S.	5 21 58.0	55.7	52.5	46.5	39.5	30.0	18.5	N.	41.5	25.0	7.7	49.5	32.8	14.0
	15	Aurigæ, (1935)	E.	N.	4 55 ..	..	0.5	27.5	55.0	21.5	49.0	S.	51.0	19.9	48.5	17.8	47.8	..
	16		W.	S.	6 52 ..	..	37.0	7.0	36.8	5.0	33.5	N.	36.0	3.5	30.2	51.3	25.0	..
	17	Aurigæ, (2139)	E.	S.	5 47 7.7	49.2	32.8	16.7	58.0	42.3	28.4	N.	26.8	17.6	9.8	0.0	56.0	54.0
	18		W.	N.	6 56 28.5	27.0	25.0	21.0	12.5	4.5	55.0	S.	52.5	38.8	24.0	5.0	48.0	31.5
	†19	α Lyræ	E.	N.	18 1 ..	..	..	..	..	..	17.0	S.	16.6	..	..	..	..	..
	20		W.	S.	19 3 ..	..	..	..	..	..	35.2	N.	34.9	..	..	..	..	..
13	21	Aurigæ, (2241)	E.	N.	6 14 ..	..	..	..	..	44.5	38.7	S.	0.0	6.0	..	..	..	..
	22		W.	S.	7 10 ..	..	..	..	..	16.0	22.5	N.	42.5	37.0	..	..	..	..
	23	Anonymous	E.	N.	3 59 48.7	11.6	34.2	57.2	20.0	43.0	4.6	S.	46.2	9.6	33.0	56.7	20.8	45.6
	24		W.	S.	6 22 37.8	2.2	27.0	51.0	15.0	38.0	1.0	N.	42.0	5.3	28.0	50.2	13.0	36.0
	25	Aurigæ, (1935)	E.	N	4 54 9.5	36.5	3.5	31.0	57.5	25.5	52.4	S.	56.0	24.0	53.2	22.8	52.0	22.0
	26		W.	S.	6 51 40.0	10.5	41.0	11.0	40.0	8.6	37.5	N.	40.8	7.5	34.8	1.8	29.4	56.5
	27	Aurigæ, (2139)	E.	S.	5 47 ..	54.6	38.0	21.0	2.3	47.0	33.0	N.	29.8	21.0	12.2	4.0	1.0	58.0
	28		W.	N.	6 57 ..	33.0	30.0	27.5	16.0	8.2	59.2	S.	57.8	43.5	28.0	10.5	52.8	36.0
16	†29	Anonymous	E.	S.	3 37 23.0	52.0	22.5	52.8	21.7	51.9	23.1	N.	19.7	52.2	24.7	55.9	30.0	4.1
	30		W.	N.	5 24 6.8	41.0	14.5	48.6	20.0	52.0	24.7	S.	20.8	51.9	22.7	51.7	22.0	52.0
	†31	Anonymous	E.	N.	4 0 1.5	23.5	47.0	9.2	32.2	54.0	18.0	S.	57.8	21.3	44.7	8.6	32.9	57.0
	32		W.	S.	6 22 49.8	14.2	39.0	3.5	27.0	50.5	13.8	N.	54.5	17.1	39.2	1.7	24.4	48.0
	†33	Bessel's Zone, 515	E.	S.	5 4 11.6	57.0	44.8	33.0	19.5	9.0	0.2	N.	17.5	22.6	24.5	24.0	31.0	40.8
	34		W.	N.	6 4 14.0	26.0	36.0	42.0	42.2	43.0	47.5	S.	6.0	58.5	48.0	35.0	23.0	10.5
	†35	Bessel's Zone, 515	E.	S.	5 6 ..	46.5	37.5	27.5	17.5	11.0	7.3	N.	49.8	55.6	2.0	11.0	27.8	48.5
	36		W.	N.	6 1 ..	39.0	58.0	16.8	24.0	32.0	36.0	S.	20.0	16.3	9.5	0.0	51.0	41.0
	†37	Anonymous	E.	N.	6 32 3.0	49.0	35.5	22.5	9.0	57.0	46.0	S.	36.0	32.0	31.0	33.3	36.0	44.0
	38		W.	S.	7 33 6.0	18.0	25.2	31.0	32.0	30.7	27.6	N.	19.0	7.4	55.8	42.0	28.0	14.0
18	39	Anonymous	E.	N.	4 0 10.8	34.0	56.5	19.0	41.7	5.0	27.0	S.	7.5	30.8	54.0	17.4	41.7	6.0
	40		W.	S.	6 22 59.7	24.1	48.1	12.0	36.7	0.4	23.0	N.	3.6	26.0	48.8	12.0	33.6	56.3
	†41	Bessel's Zone, 515	E.	S.	4 15 ..	..	..	..	..	34.0	0.8	N.	45.0	13.5	..	..	..	..
	42		W.	N.	6 17 ..	..	..	..	..	18.5	47.0	S.	31.0	59.2	..	..	..	..

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Feb. 9	+1.086	g 0.140
12	1.086	179
13	1.086	180
16	1.086	182
18	1.086	g 0.184

†Feb. 12. New Chronometer, (No. 2394. P. & F.)

1. Star diffuse and tremulous in the E., steady in the W.
3. Three stars, 8th, 9th, and 10th, magnitude, preceding in the west. Wire A rejected in the reduction. Two other stars, 7th and 8th magnitude, in the field.
19. Star steady.

LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N.Declination	R. A.	Decl.			
N.	S.	Div.	″	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	S.	″			
30.00 28.35	31.42 29.50	+ 1.42 1.15	+0.67	18 59 9.50	—27 25.74	— 1.16	18 31 42.60	38 38 33.84	+ 8.71	+16.21	H.	1	*a* Lyræ.
31.98 32.80	32.45 32.92	0.47 0.12	0.16	4 26 4.90	27 40.28	1.13	3 58 23.49	37 37 57.06	13.90	36.07	H.	5.6	Persei, (1269.)
32.40 32.92	32.55 33.05	0.15 0.13	0.07	4 59 6.48	27 40.36	1.09	4 31 25.03	37 58 48.55	13.93	27.62	H.	7	Bessel's Zone, 448.
32.41 33.80	33.02 33.95	0.61 0.15	0.20	6 22 13.16	27 40.56	1.15	5 54 31.45	37 57 47.46	13.88	+ 4.41	H.	6.7	Aurigæ, (1935.)
33.28 33.75	33.50 33.99	0.22 0.24	0.12	6 53 41.17	27 40.63	1.08	6 25 59.46	38 33 42.80	13.82	— 4.64	H.	6	Aurigæ, (2139.)
35.01 33.45	36.37 35.20	1.36 1.75	0.82	18 59 26.87	27 42.89	0.98	18 31 43.00	38 38 32.20	8.58	+17.39	H.	1	*a* Lyræ.
30.60 31.10	31.10 32.00	0.50 0.90	0.36	4 53 23.48	2 9.64	1.00	4 51 12.84	38 33 16.96	14.13	21.85	H.	7	Anonymous.
30.88 31.99	31.53 32.33	0.65 0.34	0.26	5 56 42.48	2 9.83	1.14	5 54 31.51	37 57 48.08	13.93	+ 4.22	H.	6.7	Aurigæ, (1935.)
31.45 32.15	31.95 32.25	0.50 0.10	0.16	6 28 10.63	2 9.92	1.17	6 25 59.54	38 33 43.75	13.86	— 4.87	H.	6	Aurigæ, (2139.)
32.72 32.26	33.35 33.32	0.63 1.06	0.44	18 33 55.59	2 12.09	0.97	18 31 42.53	38 38 32.17	8.50	+18.06	H.	1	*a* Lyræ.
31.20 31.50	32.10 32.45	0.90 0.95	0.48	6 45 40.84	2 14.33	1.07	6 43 25.44	38 41 8.99	13.78	— 9.85	H.	6	Aurigæ, (2241.)
30.02 31.40	31.10 32.35	1.08 0.95	0.53	5 14 23.81	2 14.06	1.10	5 12 8.65	37 31 4.30	14.00	+16.35	H.	8	Anonymous.
30.60 31.50	31.85 32.45	1.25 0.95	0.57	5 56 46.51	2 14.18	1.12	5 54 31.21	37 57 48.23	14.03	+ 4.16	H.	6.7	Aurigæ, (1935.)
31.05 31.50	32.05 32.45	1.00 0.95	0.51	6 28 15.18	2 14.26	1.10	6 25 59.82	38 33 43.62	13.87	— 4.94	H.	6	Aurigæ, (2139.)
29.10 30.55	30.10 31.45	1.00 0.90	0.50	4 34 52.19	2 26.59	1.10	4 32 24.50	38 7 34.03	14.15	+27.10	H.	6	Anonymous.
29.50 30.90	30.52 31.38	1.02 0.48	0.39	5 14 35.79	2 26.73	1.14	5 12 7.92	37 31 4.27	14.06	16.27	H.	8	Anonymous.
30.52 30.64	31.28 31.42	0.76 0.78	0.40	5 41 33.39	2 26.81	1.08	5 39 5.50	38 38 21.15	14.13	8.19	H.	8	Bessel's Zone, 515.
30.55 30.65	31.30 31.43	0.75 0.78	0.40	5 41 13.57	2 26.81	1.08	5 38 45.68	38 40 48.56	14.14	+ 8.28	H.	7.8	Bessel's Zone, 515.
30.60 31.25	31.60 31.60	1.00 0.35	0.35	7 10 1.65	2 27.09	1.26	7 7 33.30	38 37 50.32	13.64	—16.77	H.	8	Anonymous.
29.95 31.50	30.18 31.58	0.23 0.08	0.08	5 14 45.21	2 35.91	1.10	5 12 8.20	37 31 4.06	14.10	+16.19	H.	8	Anonymous.
30.15 31.50	30.30 31.70	0.15 + 0.20	+0.09	5 17 46.12	— 2 35.91	— 1.08	5 15 9.13	37 53 53.33	+14.16	+15.22	H.	8.9	Bessel's Zone, 515.

21. Star of 6th magnitude in the field.
29. Star of 8th magnitude in the field.
31. Star very unsteady.
35. Bad night; stars unsteady. Observed at same time.
37. Star of 9th magnitude in the field.
41. Close double; hazy.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVER					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. S.	s.	s.	s.	s.	s.	s.		s.	s.	s.	s.	s.	s.
Feb. 18	†1	Groombridge, 980	E.	S.	4 28 13.7	45.4	15.8	46.8	18.0	48.2	20.5	S.	38.8	12.5	46.0	20.0	54.6	31.8
	2		W.	N.	6 9 56.5	32.8	7.8	43.2	17.7	51.0	24.7	N.	44.8	15.0	46.5	18.0	49.0	19.4
21	†3	Groombridge, 1241	E.	N.	5 49 33.0	2.6	31.8	1.2	30.7	59.8	29.0	S.	42.8	14.0	44.8	16.2	49.0	22.0
	4		W.	S.	7 37 54.0	28.0	1.4	34.1	5.7	36.8	8.0	N.	21.2	51.0	20.0	49.5	18.1	48.0
	5	Aurigæ, (2239)	E.	S.	6 7 21.0	4.5	51.0	38.0	23.5	12.0	2.0	N.	18.2	15.0	13.6	11.8	15.8	22.0
	6		W.	N.	7 9 34.0	41.5	48.0	52.9	50.0	48.2	45.8	S.	2.0	52.0	40.5	25.8	13.0	59.7
22	†7	Bessel's Zone, 515	E.	N.	4 13 33.0	0.0	26.0	52.5	19.2	44.6	11.5	S.	10.0	37.0	5.5	33.5	2.0	31.6
	8		W.	S.	6 15 6.2	36.0	5.5	35.0	3.5	31.0	58.0	N.	56.0	23.0	49.0	15.5	41.8	9.0
	9	Bessel's Zone, 515	E.	S.	5 6 25.5	14.2	3.1	54.0	42.7	39.0	33.0	N.	17.5	23.0	30.0	37.0	54.5	15.0
	10		W.	N.	6 0 40.0	5.0	26.0	41.5	49.6	57.0	4.0	S.	45.5	42.0	36.4	25.4	18.2	7.0
	†11	Groombridge, 1183	E.	N.	5 31 0.5	30.1	1.7	32.0	3.8	34.0	5.2	S.	25.0	58.2	31.0	5.8	39.0	14.0
	12		W.	S.	7 13 34.8	10.0	45.0	20.3	54.4	27.6	0.6	N.	21.0	52.4	22.6	54.0	24.4	55.0
	†13	Groombridge, 1241	E.	S.	5 49 44.0	13.2	43.0	13.5	42.0	12.1	42.7	N.	37.5	8.5	41.8	13.0	45.7	18.6
	14		W.	N.	7 38 7.0	41.0	14.6	47.3	18.0	49.8	22.0	S.	16.5	47.0	17.0	45.8	15.5	45.4
26	15	Groombridge, 1011	E.	S.	4 37 35.8	4.6	34.8	5.0	33.2	3.5	34.5	N.	31.0	3.6	36.8	7.2	41.3	14.6
	16		W.	N.	6 25 8.0	41.1	15.0	48.3	19.8	52.0	24.5	S.	22.2	52.5	22.5	51.8	21.9	51.4
	†17	Groombridge, 1183	E.	N.	5 31 18.6	48.6	19.0	51.0	22.0	52.5	23.6	S.	44.6	16.0	48.0	21.5	56.5	32.8
	18		W.	S.	7 13 51.6	28.8	2.5	38.0	12.0	44.8	18.0	N.	38.5	9.5	40.2	10.6	41.8	12.5
	†19	Groombridge, 1241	E.	S.	5 50 3.0	31.2	1.0	31.0	39.0	29.5	0.0	N.	56.0	27.7	59.8	30.8	4.0	37.5
	20		W.	N.	7 38 25.0	58.0	31.5	4.5	35.6	7.2	39.0	S.	33.8	4.5	34.2	3.7	33.0	2.7
	†21	Anonymous	E.	S.	6 6 ..	21.0	12.0	6.5	55.2	50.0	47.5	N.	38.0	47.5	57.8	10.2	31.0	54.5
	22		W.	N.	6 59 ..	15.0	40.0	0.0	10.8	21.5	30.5	S.	17.8	17.0	9.0	1.5	56.0	47.0
Mar. 3	23	a^2 Geminorum	E.	S.	4 51 44.0	5.3	26.5	37.0	48.0	59.0	9.5	N.	32.9	43.5	54.5	5.5	16.3	38.0
	24		W.	N.	10 0 48.0	10.0	31.8	42.8	53.0	4.8	15.0	S.	38.2	48.4	59.9	10.5	21.4	42.5
	†25	Bessel's Zone, 515	E.	N.	5 5 7.0	53.0	40.0	27.0	14.0	2.5	51.5	S.	50.0	47.7	47.0	50.0	56.0	6.5
	26		W.	S.	6 4 57.0	12.0	25.0	31.5	34.0	33.5	31.0	N.	30.5	20.0	8.5	56.0	42.3	29.6
	†27	Bessel's Zone, 515	E.	N.	5 6 53.0	42.0	31.0	22.0	12.6	4.0	57.0	S.	17.0	22.0	27.5	39.0	56.0	15.0
	28		W.	S.	6 0 53.5	21.5	43.5	56.0	8.0	20.0	25.0	N.	45.5	38.0	29.5	21.0	11.5	0.5
	29	Groombridge, 1183	E.	S.	5 31 49.0	19.0	50.0	21.8	51.6	23.7	55.0	N.	55.8	28.8	3.0	36.5	11.0	46.8
	30		W.	N.	7 14 24.6	59.8	34.7	10.5	43.5	17.8	50.8	S.	51.0	22.8	55.0	25.5	56.6	27.8
	31	Anonymous	E.	N.	6 33 10.7	55.5	42.0	28.3	15.5	3.0	51.8	S.	48.5	43.6	42.5	44.6	49.0	56.0
	32		W.	S.	7 34 11.5	23.5	31.0	35.7	38.0	36.0	32.0	N.	26.6	14.5	3.0	49.5	35.0	22.0
	33	Groombridge, 1352	E.	S.	6 59 ..	32.5	23.2	16.6	7.2	0.8	57.0	N.	40.8	48.0	57.0	8.0	27.2	52.0
	34		W.	N.	7 53 ..	6.3	31.0	50.0	0.5	10.5	17.7	S.	2.4	58.5	53.5	45.3	36.0	27.7
4	†35	a Lyræ	E.	S.	17 58 12.8	58.0	45.0	33.6	20.0	9.7	1.9	N.	21.0	20.7	21.0	21.7	29.0	39.1
	36		W.	N.	18 58 2.3	14.3	24.0	30.8	32.0	32.0	32.2	S.	50.8	42.5	32.3	19.0	7.5	55.0
5	37	Aurigæ, (2239)	E.	S.	6 8 18.0	2.0	48.5	35.1	21.6	10.0	0.0	N.	12.0	8.8	7.0	6.0	9.0	15.0
	38		W.	N.	7 10 28.5	36.5	43.0	46.8	44.5	43.2	40.2	S.	52.6	42.6	30.8	17.0	5.0	51.0
	39	Anonymous	E.	N.	6 33 21.0	6.2	51.6	38.8	26.0	13.6	2.0	S.	57.0	54.2	52.5	53.5	58.5	6.5
	40		W.	S.	7 34 18.0	30.5	38.5	43.5	45.0	44.0	40.5	N.	35.6	24.5	12.2	59.0	46.2	31.8
	41	Groombridge, 1343	E.	S.	6 52 6.0	50.0	34.0	19.5	2.5	49.8	38.0	N.	42.0	36.5	32.5	25.6	25.8	27.8
	42		W.	N.	7 57 32.0	35.8	37.0	36.5	31.6	27.0	20.5	S.	24.7	12.8	59.0	43.5	30.0	13.8

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Feb. 18	+ 1.086	g 0.186
21	1.086	.187
22	1.086	.188
26	1.086	.186
Mar. 3	1.086	.185
4	1.086	.184
5	+ 1.086	g 0.184

1. Star flares out.
3. Pale triple star, A. 7, B. 10, C. 10.
7. Close double.
11. Triangular triple ; A. 7th magnitude, white ; B & C. 10th.
13. Triple star ; *Comites* barely visible.
17. Star unsteady.

LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
N.	S.	*Div.*	″	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	S.	″			
30.40 31.40	30.50 31.48	+ 0.10 0.08	+0.04	5 23 32.02	— 2 35.94	— 1.09	5 20 54.99	38 11 44.42	+14.17	+13.48	H.	8	Groombridge, 980.
29.89 30.30	30.79 30.96	0.90 0.66	0.41	6 47 55.20	2 49.97	1.12	6 45 4.11	38 6 8.73	13.81	—10.85	H.	6	Groombridge, 1241.
29.85 30.27	30.87 30.85	1.02 0.58	0.42	6 45 31.98	2 49.97	1.19	6 42 40.82	38 37 20.43	13.90	—10.33	H.	6	Aurigæ, (2239.)
30.35 31.30	30.97 31.95	0.62 0.65	0.33	5 18 4.03	2 54.28	1.08	5 15 8.67	37 53 53.02	14.27	+15.15	H.	8.9	Bessel's Zone, 515.
30.60 31.05	31.45 31.67	0.85 0.62	0.38	5 41 40.10	2 54.35	1.15	5 38 44.60	38 40 48.84	14.26	+ 8.05	H.	7.8	Bessel's Zone, 515.
30.90 32.12	31.50 32.80	0.60 0.68	0.33	6 26 42.77	2 54.48	1.07	6 23 47.22	38 11 2.27	13.98	— 4.88	H.	6	Groombridge, 1183.
31.10 32.10	31.65 33.00	0.55 0.90	0.38	6 47 59.63	2 54.56	1.03	6 45 4.04	38 6 8.36	13.83	—10.93	H.	6	Groombridge, 1241.
36.85 37.08	38.40 38.22	1.55 1.14	0.70	5 35 28.02	3 12.70	1.15	5 32 14.17	38 7 15.23	14.29	+10.00	H.	6	Groombridge, 1011.
36.90 37.90	38.30 38.70	1.40 0.80	0.57	6 27 0.50	3 12.84	1.18	6 23 46.48	38 11 2.92	14.05	— 5.13	H.	6	Groombridge, 1183.
36.90 37.90	38.17 38.72	1.27 0.82	0.55	6 48 17.33	3 12.90	1.15	6 45 3.28	38 6 9.34	13.90	11.24	H.	6	Groombridge, 1241.
36.95 37.40	38.45 38.58	1.50 1.18	0.69	6 40 4.08	3 12.90	1.18	6 36 50.00	38 41 37.30	14.03	9.06	H.	8	Anonymous.
29.60 34.92	30.92 36.50	1.32 1.58	0.76	7 28 23.93	3 34.80	1.08	7 24 48.05	32 13 5.23	12.95	—21.38	H.	2.3	α^2 Geminorum.
30.72 31.81	31.75 33.04	1.03 1.23	0.59	5 42 40.63	3 34.49	1.03	5 39 5.11	38 38 21.66	14.45	+ 7.71	H.	8	Bessel's Zone, 515.
30.72 31.81	31.75 33.04	1.03 1.23	0.59	5 42 20.18	3 34.49	1.03	5 38 44.66	38 40 49.42	14.45	+ 7.71	H.	7.8	Bessel's Zone, 515.
31.10 32.89	32.65 34.46	1.55 1.57	0.82	6 27 23.30	3 34.68	1.08	6 23 47.54	38 11 3.10	14.16	— 5.40	H.	6	Groombridge, 1183.
32.14 32.92	33.61 34.40	1.47 1.48	0.77	7 11 9.49	3 34.75	1.08	7 7 33.66	38 37 51.97	13.87	18.02	H.	8	Anonymous.
32.40 33.26	33.45 34.44	1.05 1.18	0.58	7 33 29.57	3 34.81	1.05	7 29 53.71	38 41 20.18	13.66	—24.24	H.	6	Groombridge, 1352.
29.68 28.68	31.75 30.75	2.07 2.07	1.09	18 35 26.39	3 41.15	1.09	18 31 44.15	38 38 28.33	7.91	+21.34	H.	1	α Lyræ.
23.70 24.85	24.12 24.55	+ 0.42 — 0.30	+0.03	6 46 26.20	3 44.22	1.27	6 42 40.71	38 37 21.74	14.11	—11.18	H.	6	Aurigæ, (2239.)
24.80 25.00	24.05 24.95	0.75 — 0.05	—0.21	7 11 18.78	3 44.30	0.90	7 7 33.58	38 37 51.57	13.90	18.27	H.	8	Anonymous.
24.85 25.15	25.00 24.95	+ 0.15 — 0.20	—0.01	7 31 31.53	— 3 44.35	— 1.17	7 27 46.01	38 35 46.48	+13.70	—23.81	H.	6.7	Groombridge, 1343.

19. Could not see the companions.
21. Followed close in east vertical by star of 9th magnitude.
25 & 27. Observed at same time.
35. Star bright and steady.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVER					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
March 8	1	Aurigæ, (2241)	E.	N.	6 12 14.0	3.3	53.0	44.0	35.7	28.0	21.5	S.	49.8	54.2	2.8	15.9	34.2	57.8
	2		W.	S.	7 5 16.0	47.4	11.0	29.3	42.0	51.0	56.6	N.	23.8	18.0	10.0	1.0	51.5	42.0
	3	Anonymous	E.	S.	6 33 49.0	34.2	21.0	9.5	56.0	45.0	35.5	N.	50.0	48.5	47.8	47.9	52.0	0.0
	4		W.	N.	7 34 51.2	2.0	10.0	15.4	16.0	14.0	12.0	S.	28.0	19.5	7.8	54.5	43.0	29.5
	5	Groombridge, 1343	E.	N.	6 52 6.5	50.2	33.5	18.5	3.0	47.7	34.0	S.	16.6	10.0	3.8	0.2	0.0	1.7
	6		W.	S.	7 57 22.0	26.5	27.5	27.2	24.0	19.5	12.3	N.	53.8	40.0	25.0	9.0	54.0	38.0
	†7	α Lyræ	E.	N.	17 58 18.0	2.0	49.0	36.0	23.8	12.0	2.5	S.	2.0	59.6	0.0	2.8	9.8	20.2
	8		W.	S.	18 57 50.8	6.0	15.2	22.5	25.7	26.8	24.6	N.	25.5	15.0	3.2	51.0	38.0	26.0
10	9	Aurigæ, (2239)	E.	N.	6 8 27.0	12.0	57.3	43.5	30.5	17.0	5.1	S.	55.5	51.0	49.0	48.0	52.1	58.0
	10		W.	S.	7 10 28.5	38.3	44.5	48.3	47.5	46.1	42.0	N.	32.0	20.2	7.2	53.2	40.0	25.4
	11	Anonymous	E.	S.	6 33 57.8	43.0	29.0	17.0	3.3	52.8	43.5	N.	59.8	59.0	57.9	57.7	2.5	10.8
	12		W.	N.	7 35 1.0	11.5	20.0	25.0	25.0	24.8	22.0	S.	39.5	30.8	20.2	6.7	55.0	40.7
	13	Groombridge, 1343	E.	N.	6 52 15.5	0.0	43.0	28.1	12.6	58.0	44.1	S.	25.0	17.1	12.1	8.7	7.5	8.9
	14		W.	S.	7 57 32.9	37.8	40.4	39.2	36.1	31.5	23.0	N.	3.0	49.6	35.0	19.0	4.2	47.5
17	†15	Lyncis, (3162)	E.	N.	7 57 37.3	59.5	22.0	44.4	6.0	28.0	50.5	S.	30.2	52.8	16.0	38.6	2.5	26.4
	16		W.	S.	10 23 58.2	22.7	46.5	9.8	33.0	56.0	18.8	N.	58.8	21.3	42.8	4.8	27.0	49.5
	17	Leonis Minoris, (3446)	E.	S.	8 17 40.0	56.0	12.0	28.5	43.8	0.0	16.0	N.	16.0	32.4	48.2	4.0	21.0	37.5
	18		W.	N.	11 44 5.5	21.5	38.8	55.5	11.2	28.0	44.0	S.	44.5	0.5	16.0	31.0	48.0	4.0
	19	Bessel's Zone, 407	E.	N.	8 28 45.7	8.0	30.0	52.8	15.0	36.8	59.0	S.	40.0	2.0	25.0	48.5	11.2	36.0
	20		W.	S.	10 54 38.0	2.2	27.0	49.5	12.0	35.5	57.5	N.	37.0	59.2	22.0	43.0	6.0	28.2
	21	β Leonis Minoris	E.	S.	9 8 29.0	51.8	15.0	37.5	0.0	22.2	46.0	N.	11.8	35.0	59.0	22.0	46.8	10.8
	22		W.	N.	11 32 41.0	4.4	29.0	53.7	16.0	40.0	4.5	S.	28.6	52.5	15.4	38.0	0.9	23.0
	†23	Bessel's Zone, 358	E.	N.	9 35 27.0	46.0	2.5	21.0	39.0	56.5	14.8	S.	35.0	53.2	11.0	29.8	48.0	7.5
	24		W.	S.	12 37 12.0	30.5	50.0	8.5	27.0	45.0	3.0	N.	23.7	42.0	59.5	16.3	34.7	52.4
	†25	α Lyræ	E.	N.	17 58 56.5	43.0	29.5	17.0	5.0	52.5	42.0	S.	40.0	38.7	38.5	41.0	48.8	58.3
	26		W.	S.	18 58 32.5	48.0	57.0	3.9	7.5	7.5	6.0	N.	5.0	55.0	43.0	30.0	18.0	5.0
21	27	β Leonis Minoris	E.	N.	9 8 39.0	1.0	23.0	45.5	8.2	31.0	53.5	S.	34.1	57.0	20.2	43.6	7.7	32.1
	28		W.	S.	11 32 47.1	11.9	36.0	0.1	23.5	47.0	9.5	N.	50.8	13.0	35.0	57.1	20.5	42.8
	†29	Bessel's Zone, 358	E.	S.	9 35 46.2	4.2	22.5	41.0	59.0	17.0	35.5	N.	43.5	2.5	21.0	39.0	58.2	17.4
	30		W.	N.	12 37 30.5	49.0	8.2	28.0	46.0	4.2	23.0	S.	31.0	49.0	7.0	25.0	44.0	3.0
	†31	Bessel's Zone, 411	E.	S.	9 36 8.0	25.5	44.5	3.0	20.0	39.0	57.0	N.	5.5	24.0	43.0	1.0	20.0	39.0
	32		W.	N.	12 37 28.0	46.5	5.6	25.5	43.0	1.5	20.8	S.	28.5	47.0	5.4	22.5	41.2	0.0
	33	Bessel's Zone, 411	E.	N.	9 43 ..	..	..	26.0	46.0	6.0	26.0	S.	56.0	17.0	37.1	58.2	..	..
	34		W.	S.	12 24 ..	..	..	31.2	51.0	12.0	32.6	N.	3.1	23.0	43.3	3.0	..	..
	35	α Bootis	E.	S.	9 59 21.2	34.8	48.5	55.0	1.8	8.8	15.5	N.	9.5	16.1	23.0	30.0	37.0	50.2
	36		W.	N.	18 25 2.6	16.4	30.0	36.9	43.5	50.5	57.0	S.	51.0	57.5	4.5	11.0	18.0	31.3
	37	α Lyræ	E.	S.	17 59 22.6	9.7	55.8	45.0	32.0	20.9	12.8	N.	34.0	33.5	34.0	35.3	42.0	52.9
	38		W.	N.	18 59 8.6	20.2	30.8	38.6	38.8	39.2	39.5	S.	0.5	52.0	41.8	28.6	17.7	4.4
30	39	β Leonis Minoris	E.	S.	9 9 32.7	54.0	15.5	36.0	57.0	19.0	41.0	N.	53.4	16.0	37.8	0.0	22.5	44.6
	40		W.	N.	11 33 42.2	5.5	27.0	50.2	11.9	34.0	57.0	S.	9.3	32.0	53.0	14.5	35.5	56.5
	41	Bessel's Zone, 407	E.	N.	9 22 17.5	47.6	19.0	49.8	21.2	52.0	24.0	S.	53.0	25.7	0.5	34.5	10.0	46.8
	42		W.	S.	10 58 8.8	44.0	20.1	57.0	30.8	3.5	38.1	N.	5.5	37.0	8.0	39.0	10.5	42.0

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Mar. 8	+ 1.086	g 0.181
10	1.086	.176
17	1.086	.172
21	1.086	.161
30	+ 1.086	g 0.160

March 27. Put in the diaphragm, which came with the instrument, but which has been redivided by Mr. Saxto
system of 21 wires, and 3 wires to micrometer diaphragm. The interval between the 1st, 2d, 3d, and 4th, and betw
18th, 19th, 20th, and 21st, and between the middle and the contiguous wires, being twice that between the others.
wires are of yellow web, and very beautiful. Intervals between the micrometer wires about 16 revolutions. Ad
for focus and collimation. Telescope south; image apparently north, and distant from middle wire, —1.2265
tions, (including the effect of level error;) Mercury unsteady; wind high.

	EL READINGS.		Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
	eans.	Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
	s.	Div.	"	H. M. S.	M. S.	s.	H. M. S.	° ' "	s.	"			
0 5	18.92 20.95	— 3.08 1.70	—1.25	6 47 22.62	—3 56.68	— 0.69	6 43 25.25	38 41 11.31	+14.27	—11.57	H.	6	Aurigæ, (2241.)
0 2	19.72 21.10	2.18 2.52	1.23	7 11 31.56	3 56.73	1.17	7 7 33.66	38 37 52.38	13.96	18.41	H.	8	Anonymous.
5 2	20.15 22.36	2.30 1.56	1.02	7 31 44.01	3 56.79	0.91	7 27 46.31	38 35 47.36	13.75	—24.09	H.	6.7	Groombridge, 1343.
8 5	30.00 29.65	1.98 1.90	1.02	18 35 43.30	3 58.79	1.06	18 31 43.45	38 38 28.34	7.79	+21.72	H.	1	α Lyræ.
2 6	25.24 25.98	0.78 0.38	0.30	6 46 48.51	4 6.14	0.98	6 42 41.39	38 27 22.20	14.22	—11.46	H.	6	Aurigæ, (2239.)
0 5	25.60 25.97	0.40 0.88	0.33	7 11 41.51	4 6.23	1.21	7 7 34.07	38 37 52.27	14.00	18.65	H.	8	Anonymous.
5 0	25.65 26.25	0.50 0.75	0.32	7 31 53.79	4 6.29	1.15	7 27 46.35	38 35 47.18	13.79	24.27	H.	6.7	Groombridge, 1343.
2 7	25.52 27.66	3.00 2.11	1.34	9 13 54.50	4 36.68	0.99	9 9 16.83	37 26 51.60	12.46	48.92	H.	4	Lyncis, (3162.)
0 5	26.30 27.93	1.80 2.52	1.14	10 2 59.92	4 36.81	1.14	9 58 21.97	35 59 21.78	11.61	56.74	H.	5	Leo. Min., (3446.)
2 4	26.15 27.82	2.47 2.12	1.21	9 44 48.45	4 36.77	1.05	9 40 10.63	37 27 27.41	11.98	54.28	H.	7	Bessel's Zone, 407.
5 5	26.95 27.90	2.50 2.25	1.24	10 23 37.68	4 36.88	1.06	10 18 59.74	37 29 26.88	11.36	59.63	H.	4.5	β Leonis Minoris.
5 6	27.25 28.62	2.50 2.04	1.19	11 8 49.06	4 37.00	1.04	11 4 11.02	36 39 9.41	10.60	—62.87	W.*	6	Bessel's Zone, 358.
5 2	31.84 31.58	2.21 2.34	1.20	18 36 23.30	4 38.27	1.12	18 31 43.91	38 38 27.75	7.52	+22.23	W.	1	α Lyræ.
5 2	23.70 25.07	4.15 3.55	2.02	10 23 51.85	4 50.93	1.02	10 18 59.90	37 29 27.76	11.39	—60.31	H.	4.5	β Leonis Minoris.
0 5	24.25 25.78	3.15 3.47	1.73	11 9 3.25	4 51.04	1.11	11 4 11.10	36 39 10.28	10.59	64.08	H.	6.7	Bessel's Zone, 358.
0 5	24.25 25.78	3.15 3.47	1.73	11 9 12.88	4 51.04	1.11	11 4 20.73	36 39 46.67	10.60	63.99	H.	7.8	Bessel's Zone, 358.
5 5	24.15 25.70	3.30 3.55	1.79	11 5 44.45	4 51.04	1.11	11 0 52.30	37 8 24.16	10.67	63.88	H.	6.7	Bessel's Zone, 411.
4 2	24.06 28.72	3.58 3.20	1.78	14 13 33.24	4 51.51	1.08	14 8 40.65	19 58 55.85	8.91	—60.51	H.	1	α Bootis.
5 0	28.65 29.01	3.10 2.89	1.57	18 36 36.67	4 52.18	1.03	18 31 43.46	38 38 27.35	7.36	+22.35	H.	1	α Lyræ.
0 5	25.35 26.95	2.25 2.60	1.28	10 24 25.12	5 24.60	1.12	10 18 59.40	37 29 29.45	11.48	—61.75	H.	4.5	β Leonis Minoris.
0 2	25.70 27.17	2.20 — 2.15	—1.14	10 14 45.01	—5 24.57	—1.08	10 9 19.36	38 16 24.20	+11.69	—60.70	H.	8	Bessel's Zone, 407.

7. Star bright and steady in the East. Very hazy in the West.
15. Star flares out.
23. Star of 7.8th magnitude near. Observation not satisfactory in the West.
25. In the East bright and well defined, but slightly tremulous. In the West, telescope North, star indistinct and unsteady on wires F, C, and A ; on the other four distinct and steady.
29 & 31. Observed at same time.

* Passed Midshipman Worden.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVER					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
April 4	†1	α Lyræ	E.	S.	18 0 32.0	12.0	57.0	41.0	26.5	13.5	3.0	N.	28.0	26.0	23.5	18.5	20.0	26.0
	2		W.	N.	19 0 28.5	34.5	37.0	40.0	36.5	36.0	31.0	S.	53.5	43.5	30.5	16.5	1.0	44.0
6	†3	Bessel's Zone, 493	E.	S.	8 16 ..	..	..	..	..	53.0	31.7	N.	1.0	42.8	..	..	..	..
	4		W.	N.	9 38 ..	..	..	..	..	20.8	3.5	S.	33.5	12.7	..	..	..	..
	5	Bessel's Zone, 407	E.	N.	8 30 14.8	34.0	56.5	17.3	38.1	59.5	21.0	S.	45.5	8.0	29.2	51.5	13.5	36.6
	6		W.	S.	10 56 4.6	26.5	49.5	11.5	33.9	55.0	17.3	N.	41.0	2.7	23.7	44.7	5.8	27.8
	7	Bessel's Zone, 407	E.	S.	8 42 45.8	4.0	22.1	41.0	59.1	18.0	37.2	N.	51.0	10.6	30.0	48.8	8.0	26.9
	8		W.	N.	11 29 50.2	9.5	28.6	47.9	6.5	25.7	45.5	S.	59.5	18.5	37.0	55.5	14.1	32.0
9	9	Bessel's Zone, 411	E.	S.	10 41 25.0	47.0	8.5	30.7	52.5	15.0	38.2	N.	7.6	31.8	54.8	18.0	41.7	4.6
	10		W.	N.	12 59 14.5	38.0	1.0	25.0	48.4	11.5	35.7	S.	5.0	28.8	51.0	13.3	35.8	57.2
	†11	Bessel's Zone, 411	E.	N.	11 6 35.0	16.0	54.0	36.0	..	..	..	S.	..	..	..	2.5	48.5	37.0
	12		W.	S.	11 43 41.0	29.7	17.0	5.2	..	..	..	N.	..	..	..	31.5	11.3	50.4
	13	Bessel's Zone, 463	E.	S.	12 19 32.0	54.4	16.0	38.4	0.6	22.5	46.0	N.	15.6	39.5	2.7	26.0	49.5	12.8
	14		W.	N.	14 37 31.3	55.0	18.3	42.0	5.4	28.3	52.3	S.	22.2	45.2	7.0	29.5	52.1	13.7
	15	Can. Ven., (4311)	E.	N.	11 59 34.6	4.8	39.0	11.7	45.0	17.5	52.0	S.	9.0	46.0	22.8	59.5	37.5	17.8
	16		W.	S.	13 29 0.8	36.0	18.0	54.8	31.9	6.9	44.9	N.	0.6	35.9	8.8	42.5	15.6	49.5
	17	Bessel's Zone, 463	E.	S.	12 44 27.0	10.6	55.4	42.8	29.3	18.6	10.0	N.	40.0	41.3	41.0	42.5	49.6	56.5
	18		W.	N.	13 41 25.0	37.0	44.0	50.6	53.0	53.0	52.5	S.	26.8	18.5	6.7	54.0	41.0	25.0
14	†19	Lyncis, (3162)	E.	S.	7 59 39.0	59.5	20.0	41.1	2.0	23.0	45.2	N.	9.5	32.0	54.0	15.9	38.2	0.0
	20		W.	N.	10 25 57.0	19.2	41.0	3.2	24.8	46.5	9.5	S.	34.5	56.5	17.9	38.2	59.8	20.0
	21	Bessel's Zone, 407	E.	S.	8 55 2.0	29.0	57.0	25.0	53.8	22.5	52.5	N.	49.5	20.5	51.8	22.0	53.8	24.5
	22		W.	N.	10 40 59.0	30.0	1.5	33.0	4.0	34.5	6.0	S.	2.6	33.2	1.8	29.1	58.9	26.2
	†23	Leonis Minoris, (3364)	E.	N.	9 14 50.8	13.8	37.7	1.5	27.0	50.2	15.3	S.	1.0	27.6	55.0	22.7	50.8	19.7
	24		W.	S.	10 17 1.0	31.0	0.0	27.0	54.7	22.2	49.5	N.	33.2	59.0	23.0	48.0	11.8	35.8
15	25	Lyncis, (3162)	E.	S.	7 59 42.3	3.0	23.5	45.0	5.6	26.4	49.0	N.	13.3	36.2	58.0	19.9	42.0	3.7
	26		W.	N.	10 26 1.8	23.0	45.5	7.7	29.0	51.0	14.0	S.	38.8	0.6	21.5	43.0	3.9	24.1
	27	Leonis Minoris, (3261)	E.	N.	8 6 46.2	3.5	23.0	42.0	0.8	19.0	38.5	S.	53.2	13.0	32.0	51.5	11.2	31.6
	28		W.	S.	10 50 41.5	0.0	20.5	40.0	59.8	18.2	38.0	N.	52.3	11.5	30.8	49.0	8.0	27.8
	†29	Leonis Minoris, (3446)	E.	S.	8 19 36.5	51.0	5.7	21.0	35.8	50.9	6.6	N.	6.5	23.0	38.0	53.1	9.0	24.0
	30		W.	N.	11 45 59.5	14.5	30.0	45.0	0.0	15.0	31.0	S.	31.5	47.3	2.5	17.0	32.8	47.9
	31	Bessel's Zone, 407	E.	N.	8 43 24.3	41.0	0.5	18.6	37.0	55.3	15.0	S.	27.5	47.0	5.5	24.8	44.0	4.0
	32		W.	S.	11 30 26.8	45.0	5.0	24.8	43.5	1.6	21.5	N.	34.0	53.0	11.7	30.2	48.5	8.0
	33	Bessel's Zone, 407	E.	S.	9 12 15.5	43.0	10.0	39.7	8.0	36.4	8.0	N.	5.8	37.7	8.5	39.7	11.7	42.8
	34		W.	N.	10 56 51.0	23.8	54.5	27.2	58.0	28.0	0.8	S.	59.5	30.9	59.5	27.5	56.0	24.6
	35	Bessel's Zone, 411	E.	S.	9 39 43.0	4.8	26.0	48.0	10.3	32.0	55.2	N.	24.5	47.5	11.0	33.6	56.8	20.0
	36		W.	N.	11 59 28.0	50.5	14.0	37.0	0.0	22.8	46.7	S.	16.0	38.5	1.0	22.8	44.8	6.0
16	37	Leonis Minoris, (3252)	E.	S.	8 8 0.5	19.7	38.3	57.9	17.2	36.0	56.8	N.	13.2	34.0	54.0	13.9	34.1	54.0
	38		W.	N.	10 47 56.6	16.5	36.0	56.0	15.1	34.8	55.0	S.	13.8	33.8	53.0	12.4	32.0	51.0
	39	Bessel's Zone, 407	E.	N.	9 12 20.2	46.2	16.0	44.7	13.4	41.8	12.0	S.	8.8	40.7	11.0	41.5	13.5	47.0
	40		W.	S.	10 56 54.5	25.3	59.8	31.0	2.0	32.5	4.0	N.	2.5	32.6	0.8	30.0	58.5	27.9
	†41	Bessel's Zone, 407	E.	S.	9 35 48.0	20.9	54.0	28.5	3.0	..	..	N.	..	..	32.2	11.5	54.2	36.0
	42		W.	N.	10 19 4.0	47.0	30.0	11.5	51.7	..	..	S.	..	..	18.2	51.8	26.8	0.5

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
April 4	+ 1.086	g 0.139
6	1.086	.149
9	1.086	.160
14	1.086	.166
15	1.086	.168
16	+ 1.086	g 0.169

1. Very tremulous; cap on in East. Light clouds.
3. The wires omitted were lost from interference with other stars.
11. Single revolutions of micrometer.

LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
N.	S.	Div.	″	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	S.	″			
28.30 29.55	26.74 27.55	— 1.56 2.00	—0.94	18 37 29.36	—5 43.03	—1.20	18 31 45.13	38 38 27.36	+ 6.90	+21.95	W.	1	*a* Lyræ.
19.55 21.10	16.50 18.55	3.05 2.55	1.47	8 59 32.37	5 49.35	0.99	8 53 42.03	38 26 55.57	13.21	—48.22	H.	8	Bessel's Zone, 493.
19.85 21.90	17.30 19.75	2.55 2.15	1.23	9 46 1.23	5 49.47	1.04	9 40 10.72	37 27 30.64	12.26	57.10	H.	7	Bessel's Zone, 407.
19.72 22.40	17.95 20.05	1.77 2.35	1.09	10 8 48.20	5 49.51	1.14	10 2 57.55	37 0 16.87	11.82	60.57	H.	8	Bessel's Zone, 407.
25.15 26.94	22.13 23.66	3.02 3.28	1.65	11 53 21.72	6 1.54	1.11	11 47 19.07	37 36 45.00	9.94	68.90	H.	7.8	Bessel's Zone, 411.
25.35 25.52	21.95 22.45	3.40 3.07	1.69	11 28 3.41	6 1.48	0.92	11 22 1.01	38 47 59.55	10.44	68.66	H.	7	Bessel's Zone, 411.
25.85 27.45	23.05 23.95	2.80 3.50	1.65	13 31 33.92	6 1.81	1.17	13 25 30.94	37 36 35.95	8.25	62.26	H.	8	Bessel's Zone, 463.
26.00 26.85	22.55 23.80	3.45 3.05	1.70	12 48 57.03	6 1.69	1.01	12 42 54.33	38 21 10.16	8.92	66.88	H.	6	Can. Ven., (4311.)
26.55 27.10	23.65 24.30	2.90 2.80	1.49	13 20 17.47	6 1.78	1.06	13 14 14.63	38 39 45.04	8.39	63.79	H.	7	Bessel's Zone, 463.
23.30 25.04	19.40 20.89	3.90 4.15	2.11	9 15 39.66	6 21.54	1.11	9 9 17.01	37 26 55.61	12.94	52.05	H.	4	Lyncis, (3162.)
24.54 25.30	20.44 20.88	4.10 4.42	2.24	9 51 57.68	6 21.65	1.13	9 45 34.90	38 8 12.59	12.35	59.24	H.	9	Bessel's Zone, 407.
25.00 25.05	20.35 20.05	4.65 5.00	2.53	9 49 24.94	6 21.64	1.17	9 43 2.13	38 37 55.14	12.38	58.94	H.	7	Leo. Min., (3364.)
22.02 24.95	19.80 21.15	2.22 3.80	1.57	9 15 43.68	6 25.43	1.25	9 9 17.00	37 26 55.49	12.96	52.14	H.	4	Lyncis, (3162.)
22.38 25.15	19.65 22.05	2.73 3.10	1.54	9 31 15.65	6 25.48	1.12	9 24 49.05	37 4 33.66	12.67	54.98	H.	5	Leo. Min., (3261.)
22.30 25.70	19.70 22.45	2.60 3.25	1.54	10 4 49.15	6 25.57	1.13	9 58 22.45	35 59 26.75	11.99	61.78	H.	5	Leo. Min., (3446.)
23.05 25.45	20.10 22.34	2.95 3.11	1.59	10 9 24.50	6 25.58	1.10	10 2 57.82	37 0 18.48	11.97	61.76	H.	8	Bessel's Zone, 407.
23.45 25.45	20.50 22.05	2.95 3.40	1.66	10 8 33.41	6 25.58	1.15	10 2 6.68	38 9 21.46	12.06	61.99	H.	7.8	Bessel's Zone, 407.
24.31 26.02	20.99 22.54	3.32 3.48	1.78	10 52 35.38	6 25.70	1.10	10 46 8.58	37 34 35.48	11.17	67.14	H.	9	Bessel's Zone, 411.
24.45 26.21	20.25 22.42	4.20 3.79	2.10	9 30 34.99	6 29.37	1.05	9 24 4.57	37 9 51.88	12.70	55.13	H.	6	Leo. Min., (3252.)
25.10 26.30	21.10 22.48	4.00 3.82	2.06	10 8 36.81	6 29.47	1.07	10 2 6.27	38 9 21.73	12.07	62.05	H.	7.8	Bessel's Zone, 407.
25.00 25.95	21.70 22.02	3.30 — 3.93	—1.90	10 1 11.11	—6 29.45	—1.30	9 54 40.36	38 45 54.98	+12.36	—61.10	H.	7.8	Bessel's Zone, 407.

17. Dimly seen through haze in the East. Barely distinguishable in the West.
23. Single revolutions of micrometer.
27. Beautiful quadruple star. Three other stars in the field.
41. Single revolutions of micrometer.

Assumed Latitude 38° 53′ 38″.80 North.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES. A.	B.	C.	D.	E.	F.	G.	Telescope.	TIMES OF TRANSIT OVER G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
April 16	1	Bessel's Zone, 411	E.	N.	9 57 48.3	18.5	53.5	27.0	0.5	34.5	9.6	S.	31.0	8.9	45.8	23.6	2.5	44.5
	2		W.	S.	11 24 59.2	36.5	17.4	57.0	35.0	11.3	50.0	N.	12.0	47.1	21.1	55.0	28.8	3.1
	3	Bessel's Zone, 411	E.	S.	10 28 ..	..	..	..	25.0	0.3	37.7	N.	3.0	44.0	22.0	..	..	..
	4		W.	N.	11 52 ..	..	..	..	55.0	34.0	14.8	S.	39.0	17.4	52.8	..	..	..
19	5	Bessel's Zone, 407	E.	S.	9 23 45.0	15.0	45.5	16.5	48.0	18.7	52.0	N.	0.5	35.8	9.3	43.0	19.0	54.2
	6		W.	N.	10 59 30.5	6.0	41.8	17.0	50.6	25.8	0.2	S.	10.0	43.6	15.0	45.5	17.3	47.0
	7	Bessel's Zone, 499	E.	N.	9 35 ..	46.0	5.0	23.0	41.8	0.0	18.5	S.	32.3	51.8	10.2	29.0	48.7	8.5
	8		W.	S.	12 23 ..	8.2	28.0	47.0	6.8	25.0	45.0	N.	57.0	16.0	34.5	52.5	10.8	30.5
	9	Bessel's Zone, 411	E.	S.	9 57 57.8	30.8	3.8	37.2	10.5	44.7	21.0	N.	42.5	21.2	58.3	37.0	16.8	55.2
	10		W.	N.	11 25 6.8	47.0	26.0	5.8	43.0	20.9	59.2	S.	23.0	59.0	33.0	6.7	40.5	13.0
	11	Bessel's Zone, 411	E.	S.	10 23 26.5	53.0	20.0	47.7	14.2	42.0	11.5	N.	4.5	34.7	4.2	33.0	3.5	33.8
	12		W.	N.	12 13 29.2	0.5	30.0	1.0	29.0	59.0	29.0	S.	21.8	52.0	20.0	46.2	13.5	41.0
	13	Bessel's Zone, 411	E.	N.	10 12 55.0	10.5	29.0	46.2	3.5	20.7	38.1	S.	47.2	5.8	22.9	41.0	58.8	17.2
	14		W.	S.	13 10 49.0	6.5	25.2	43.3	1.5	18.8	36.0	N.	49.9	6.8	24.8	42.0	59.4	17.5
	15	Bessel's Zone, 463	E.	S.	11 44 2.0	23.0	44.5	6.5	28.0	50.3	13.0	N.	42.5	6.2	29.5	51.0	14.0	37.5
	16		W.	N.	14 4 37.0	0.3	23.7	46.2	9.0	32.0	55.0	S.	25.1	48.2	10.5	31.9	53.0	15.0
	17	Can. Ven., (4311)	E.	N.	12 0 16.2	45.2	19.8	52.8	25.8	59.0	33.5	S.	48.5	25.0	1.5	38.8	16.5	56.2
	18		W.	S.	13 29 37.0	12.8	54.0	30.9	8.6	45.4	21.5	N.	37.0	11.2	44.0	17.3	50.8	24.0
	†19	Bessel's Zone, 463	E.	N.	12 48 6.0	31.5	56.0	21.0	48.0	13.2	40.8	S.	28.0	56.8	26.0	56.0	27.0	56.5
	†20		W	S.	13 46 19.5	52.0	21.0	52.0	21.0	53.0	21.0	N.	9.0	37.0	4.0	30.0	54.5	20.5
	†21	α Lyræ	E.	S.	18 1 33.5	15.5	59.2	44.0	29.7	16.5	7.0	N.	30.8	27.2	26.5	23.7	24.8	29.0
	†22		W.	N.	19 1 19.0	25.5	29.0	31.6	28.2	28.0	24.0	S.	50.5	41.0	27.7	11.0	58.0	43.0
20	†23	Bessel's Zone, 411	E.	N.	9 58 2.4	33.0	7.4	42.0	15.6	49.5	24.6	S.	44.0	21.0	58.0	36.2	15.0	57.0
	†24		W.	S.	11 25 20.6	58.0	40.4	18.4	56.0	33.2	12.0	N.	29.4	4.8	38.2	11.8	46.0	21.0
21	25	Bessel's Zone, 411	E.	N.	10 26 25.5	56.5	32.7	6.8	41.6	17.0	53.5	S.	19.6	58.5	37.5	17.0	57.2	41.0
	26		W.	S.	11 50 36.0	14.3	57.8	38.8	18.2	57.5	36.0	N.	1.6	38.2	13.7	48.4	22.0	58.4
27	†27	Bessel's Zone, 411	E.	S.	10 17 44.7	10.0	35.4	0.8	26.0	51.8	18.5	N.	1.0	28.5	55.2	22.6	50.2	16.9
	†28		W.	N.	12 17 21.3	52.0	18.5	46.0	11.2	38.8	6.8	S.	49.2	16.0	41.1	6.1	32.0	56.8
	29	Anonymous	E.	N.	10 31 40.0	9.0	44.5	17.8	51.0	24.5	59.0	S.	19.5	56.5	32.8	10.0	49.0	30.0
	30		W.	S.	12 0 6.6	42.8	24.5	2.4	40.2	16.4	53.0	N.	14.0	48.0	22.0	55.0	28.8	2.4
	†31	Anonymous	E.	S.	11 1 49.0	13.5	37.2	2.5	26.0	51.2	17.3	N.	57.0	23.3	50.0	16.0	43.0	9.0
	†32		W.	N.	13 5 4.5	31.0	57.5	24.6	50.8	17.5	44.5	S.	24.5	51.8	15.8	40.0	5.2	28.9
	33	Bessel's Zone, 463	E.	N.	11 44 37.8	57.9	20.8	42.2	3.7	26.0	48.0	S.	16.8	39.3	1.6	24.5	47.8	12.3
	34		W.	S.	14 5 16.0	37.0	0.9	24.0	48.0	10.0	32.2	N.	1.0	22.0	44.0	6.0	27.0	50.2
	†35	Bessel's Zone, 463	E.	N.	12 48 38.0	1.0	27.7	52.5	19.0	45.0	11.7	S.	3.7	32.8	2.0	31.2	1.3	33.0
	†36		W.	S.	13 46 55.0	24.5	57.2	28.0	58.0	28.0	57.7	N.	48.0	16.2	42.8	8.0	33.6	58.8
	37	Anonymous	E.	S.	13 20 22.2	45.5	11.0	37.0	1.5	26.5	53.5	N.	33.8	1.6	28.0	54.5	21.6	48.0
	38		W.	N.	15 21 35.5	3.0	30.3	58.0	23.6	50.8	18.1	S.	0.0	26.8	51.0	16.5	41.5	6.8
	†39	Anonymous	E.	N.	13 33 26.0	46.5	9.0	30.2	52.7	13.1	36.0	S.	3.8	26.0	48.0	11.0	34.0	57.7
	†40		W.	S.	15 55 1.0	24.0	47.0	11.5	34.0	57.0	20.0	N.	46.0	8.5	29.0	51.5	12.5	35.0
	41	Bessel's Zone, 415	E.	S.	14 41 15.2	41.5	6.2	33.2	59.8	27.0	54.3	N.	43.0	12.6	39.5	8.0	38.0	5.0
	42		W.	N.	16 35 30.2	59.9	28.0	57.4	25.6	53.6	23.0	S.	10.2	38.4	5.1	31.7	58.2	23.8

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
April 16	+ 1.086	g 0.169
19	— 0.830	.170
20	+ 0.215	.170
21	0.215	.167
27	+ 4.206	g 0.150

19. Single revolutions of micrometer.
21. Cap on, star very tremulous.
23. Adjusted level.
27. Coarse double; observed the brightest. Adjusted level before commencing observations.

LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N.Declination	R. A.	Decl.			
N.	S.	*Div.*	"	H. M. S.	M. S.	S.	H. M. S.	° ' "	S.	"			
25.49 26.22	21.81 22.50	− 3.68 3.72	−1.94	10 46 10.64	−6 29.59	−1.09	10 39 39.96	38 22 44.06	+11.35	− 66.85	H.	7.8	Bessel's Zone, 411.
25.65 26.35	22.30 22.55	3.35 3.80	1.88	11 13 8.75	6 29.63	−1.17	11 6 37.95	38 24 51.74	10.81	69.00	H.	8.9	Bessel's Zone, 411.
16.40 17.95	12.35 13.35	4.05 4.60	2.27	10 16 0.76	6 41.55	+0.74	10 9 19.95	38 16 26.93	11.99	63.59	H.	8	Bessel's Zone, 407.
16.89 19.20	12.35 14.10	4.54 5.10	2.53	11 1 38.19	6 41.68	0.78	10 54 57.29	36 59 52.37	11.04	68.38	H.	7	Bessel's Zone, 499.
16.95 18.55	12.80 13.15	4.15 5.40	2.50	10 46 21.52	6 41.64	0.60	10 39 40.48	38 22 44.40	11.39	67.35	H.	7.8	Bessel's Zone, 411.
17.35 19.20	12.65 14.15	4.70 5.05	2.56	11 22 16.89	6 41.75	0.78	11 15 35.92	38 4 38.13	10.65	70.01	H.	8	Bessel's Zone, 411.
17.40 19.88	12.60 14.85	4.80 5.03	2.58	11 44 14.26	6 41.81	0.81	11 37 33.26	36 44 43.98	10.20	70.49	H.	8	Bessel's Zone, 411.
18.40 21.25	13.72 15.90	4.68 5.35	2.64	12 57 19.00	6 42.02	0.76	12 50 37.74	37 33 36.27	8.91	68.30	H.	10	Bessel's Zone, 463.
18.70 20.10	14.05 15.55	4.65 4.55	2.41	12 49 35.01	6 41.99	0.85	12 42 53.87	38 21 12.43	8.93	69.05	H.	6	Can. Ven., (4311.)
19.35 20.75	14.70 15.65	4.65 5.10	2.56	13 20 54.85	6 42.08	0.71	13 14 13.48	38 39 47.83	8.35	−66.09	H.	7	Bessel's Zone, 463.
25.60 26.25	19.75 20.57	5.85 − 5.68	−3.03	18 38 28.03	6 42.97	+0.88	18 31 45.94	38 38 29.33	6.41	+20.26	H.	1	*a* Lyræ.
13.49 15.02	18.94 20.45	+ 5.45 5.43	+2.85	10 46 27.15	6 46.75	−0.22	10 39 40.18	38 22 44.57	11.41	−67.50	M.	7.8	Bessel's Zone, 411.
17.25 18.00	22.25 23.35	5.00 5.35	2.71	11 13 27.69	6 49.93	0.16	11 6 37.60	38 24 52.26	10.88	69.94	H.	8.9	Bessel's Zone, 411.
28.98 30.02	29.70 30.85	0.72 0.83	0.40	11 21 3.77	7 13.37	4.19	11 13 46.21	37 55 49.09	10.80	71.23	H.	9.10	Bessel's Zone, 411.
29.40 29.65	29.50 30.70	0.10 1.05	0.30	11 20 36.44	7 13.37	4.13	11 13 18.94	38 21 53.68	10.82	71.33	H.	9	Anonymous.
29.06 30.59	30.12 30.95	1.06 0.36	0.36	12 6 50.75	7 13.48	4.30	11 59 32.97	37 52 12.97	9.85	72.43	H.	9.10	Anonymous.
29.40 31.28	30.70 32.60	1.30 1.32	0.68	12 57 54.35	7 13.62	4.20	12 50 36.53	37 33 37.68	8.85	70.06	H.	10	Bessel's Zone, 463.
30.50 31.20	31.40 32.25	0.90 1.05	0.51	13 21 30.15	7 13.67	4.16	13 14 11.32	38 39 48.96	8.36	67.87	H.	7	Bessel's Zone, 463.
31.05 32.65	31.81 33.00	0.76 0.35	0.29	14 24 26.14	7 13.83	4.26	14 17 8.05	37 54 13.92	7.37	57.92	H.	9	Anonymous.
31.20 32.70	31.90 33.40	0.70 0.70	0.36	14 47 10.95	7 13.89	4.21	14 39 52.85	37 32 29.76	7.08	53.08	H.	9.10	Anonymous.
31.43 32.95	32.53 33.65	1.10 + 0.70	+0.47	15 42 2.64	−7 14.02	−4.26	15 34 44.38	38 0 53.45	+ 6.42	−39.32	H.	8	Bessel's Zone, 415.

31. Two stars 9th and 10th magnitude, in company.
35. Single revolutions of micrometer.
39. Very hazy in the West; could barely see the star.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVER					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
May 2	1	Bessel's Zone, 463 . . .	E.	N.	12 5 53.8	11.0	31.2	49.5	9.3	28.5	47.0	S.	1.0	21.5	41.1	0.9	21.0	41.2
	2		W.	S.	14 48 24.6	43.3	4.0	23.8	43.4	3.0	22.5	N.	38.5	57.8	16.8	35.9	54.8	14.2
	3	Bessel's Zone, 463 . . .	E.	S.	12 16 43.5	13.6	43.0	13.5	43.8	14.1	46.2	N.	52.3	26.8	0.0	32.3	7.5	41.0
	4		W.	N.	13 54 56.5	31.7	5.8	40.0	12.2	45.5	20.0	S.	25.5	58.0	28.5	58.2	29.0	58.9
	†5	Can. Ven., (4536) . . .	E.	N.	12 33 24.1	47.9	14.5	40.2	6.6	32.0	59.5	S.	44.1	12.0	38.1	6.6	35.0	4.5
	6		W.	S.	14 30 26.5	53.5	22.7	50.5	18.6	45.8	13.0	N.	59.2	26.0	51.5	17.9	43.5	10.0
	†7	Bessel's Zone, 415 . . .	E.	N.	13 27 8.5	27.7	49.2	9.5	30.0	51.0	12.4	S.	35.8	58.0	19.0	40.6	2.0	25.0
	8		W.	S.	15 55 14.8	35.0	57.8	20.0	41.5	2.5	24.0	N.	48.0	9.5	29.8	50.5	11.2	32.7
	9	Bessel's Zone, 415 . . .	E.	S.	13 43 2.0	20.0	38.0	57.5	16.0	35.0	54.5	N.	9.2	29.2	48.2	7.9	27.5	46.2
	10		W.	N.	16 28 9.0	29.2	48.2	7.9	27.0	46.0	6.1	S.	20.5	40.2	58.9	17.4	36.1	54.6
	†11	Bessel's Zone, 421 . . .	E.	N.	15 8 53.0	12.0	33.8	53.8	14.3	35.0	55.8	S.	18.5	40.0	1.0	22.5	44.0	6.6
	12		W.	S.	17 38 2.4	23.3	45.8	7.2	28.8	50.0	11.6	N.	34.7	55.2	15.9	36.7	57.0	18.1
	13	Bessel's Zone, 421 . . .	E.	S.	15 24 16.5	44.6	12.5	41.0	8.9	37.5	7.8	N.	5.0	36.5	7.0	37.8	9.3	40.1
	14		W.	N.	17 10 0.0	31.8	3.0	34.8	5.5	36.0	7.8	S.	4.4	34.5	3.3	31.5	0.0	27.8
	15	*a* Lyræ	E.	N.	18 2 23.8	4.9	50.0	34.9	21.8	7.6	56.0	S.	17.4	14.0	9.9	8.9	10.1	16.8
	16		W.	S.	19 2 13.5	17.5	23.0	26.0	24.9	21.5	16.8	N.	39.0	27.0	13.2	58.8	44.5	31.8
4	17	Bessel's Zone, 411 . . .	E.	N.	10 24 23.8	49.0	17.5	44.6	11.5	39.0	7.8	S.	0.0	29.5	58.2	27.8	58.0	29.5
	18		W.	S.	12 14 28.8	57.7	29.0	59.0	28.8	57.5	26.9	N.	18.9	46.8	14.0	42.0	8.8	37.0
	†19	Bessel's Zone, 463 . . .	E.	S.	11 15 10.6	30.4	49.9	10.0	29.5	49.7	10.1	N.	30.5	51.8	12.5	32.9	53.9	14.1
	20		W.	N.	13 50 4.0	25.0	45.8	6.9	27.1	48.0	9.0	S.	29.0	49.5	10.0	30.0	49.9	9.0
	21	Can. Ven., (4311) . . .	E.	N.	12 1 10.9	40.9	14.5	47.9	20.6	53.8	27.9	S.	45.5	22.5	58.2	35.4	13.3	54.0
	22		W.	S.	13 30 32.7	8.6	49.4	27.7	4.0	40.6	16.6	N.	34.8	9.0	41.8	15.0	48.3	21.8
	23	Bessel's Zone, 463 . . .	E.	N.	12 33 26.8	45.5	7.6	27.8	49.0	9.5	31.0	S.	53.5	15.7	36.5	58.3	20.0	42.6
	24		W.	S.	15 2 23.0	43.3	6.6	28.0	49.8	10.5	31.5	N.	55.0	16.3	36.8	58.0	18.0	40.0
	25	Anonymous	E.	S.	12 49 25.2	49.5	12.0	37.0	1.0	25.0	51.0	N.	29.0	55.8	21.5	46.4	12.8	38.8
	26		W.	N.	14 55 14.0	40.4	6.0	32.1	57.0	23.0	49.6	S.	27.0	53.0	17.2	41.4	5.5	29.0
	†27	Bessel's Zone, 415 . . .	E.	S.	14 4 59.5	34.3	9.0	45.0	20.8	57.0	35.0	N.	6.8	49.0	30.3	10.8	54.0	35.0
	28		W.	N.	15 26 10.0	54.0	36.0	19.6	59.5	40.0	22.4	S.	53.5	32.3	8.4	44.8	20.2	54.8
11	†29	a^2 Geminorum	E.	S.	4 55 54.6	14.0	34.8	54.0	4.1	14.0	24.2	N.	5.5	16.0	26.0	36.0	56.0	17.0
	30		W.	N.	10 4 58.4	18.0	38.0	58.0	8.0	18.5	29.0	S.	10.3	20.5	30.5	40.5	0.5	21.0
	†31	Bessel's Zone, 411 . . .	E.	S.	10 47 38.2	0.0	21.0	43.8	5.5	27.5	51.1	N.	20.4	44.3	7.2	30.0	53.1	16.1
	32		W.	N.	13 6 55.5	18.5	42.0	5.5	28.0	51.0	14.0	S.	44.0	7.5	29.2	51.0	13.0	35.0
	†33	Bessel's Zone, 411 . . .	E.	S.	10 47 51.5	13.8	35.0	57.0	19.0	41.2	4.0	N.	34.0	58.0	20.8	43.8	7.0	30.5
	34		W.	N.	13 6 56.0	19.0	43.0	6.0	28.8	52.0	15.2	S.	45.2	8.7	30.5	52.2	14.4	36.2
	†35	Anonymous	E.	N.	11 19 8.0	40.0	11.0	46.0	21.0	58.0	32.5	S.	8.0	52.0	37.0	21.0	7.0	57.0
	36		W.	S.	11 59 46.0	40.5	29.5	20.0	3.0	48.5	30.5	N.	5.5	41.0	14.5	50.0	23.5	58.0
	37	*a* Cor. Bor.	E.	N.	12 13 32.1	47.0	54.5	2.5	10.1	18.0	26.0	S.	11.0	19.0	26.8	34.6	43.0	50.2
	38		W.	S.	18 56 24.0	39.2	47.0	55.0	2.9	10.6	18.2	N.	3.0	11.0	19.0	27.0	35.2	43.0
	39	Bessel's Zone, 463 . . .	E.	S.	12 33 50.5	10.5	30.5	51.7	11.5	32.2	53.8	N.	18.1	40.3	2.0	23.0	44.5	6.0
	40		W.	N.	15 2 44.0	6.0	27.0	49.0	10.0	32.0	54.2	S.	18.3	39.0	0.5	20.6	41.5	1.8
	41	Bessel's Zone, 415 . . .	E.	N.	12 54 30.0	50.0	11.5	32.0	53.5	15.2	37.0	S.	2.5	24.0	45.0	8.0	29.9	52.8
	42		W.	S.	15 19 11.0	32.2	55.2	18.0	40.5	1.5	24.0	N.	49.2	11.0	32.0	53.4	14.0	36.5

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
April 27	+ 4.206	*g* 0.150
May 2	4.206	.148
4	4.206	.143
11	+ 4.206	*g* 0.147

5. Coarse double, companion 11th magnitude; another star of 9th magnitude in the field.
7. Two stars of 9th magnitude in company.
11. Close double.
19. In a loose cluster of 5 stars; observed the brightest.

	LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
	Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
	N.	S.	Div.	"	H. M. S.	M. S.	S.	H. M. S.	° ' "	S.	"			
1 2	30.35 31.56	31.42 31.99	+ 1.07 0.43	+0.39	13 29 42.56	—7 27.13	—4.26	13 22 11.17	37 6 27.54	+ 8.32	—67.95	H.	9.10	Bessel's Zone, 463.
3 4	30.50 31.05	31.28 31.95	0.78 0.90	0.43	13 10 6.15	7 27.06	4.20	13 2 34.89	38 14 36.24	8.63	71.73	H.	7.8	Bessel's Zone, 463.
5 6	30.45 31.45	31.45 32.00	1.00 0.55	0.40	13 35 28.93	7 27.14	4.27	13 27 57.52	37 58 16.77	8.16	67.25	H.	7	Can. Ven., (4536.)
7 8	30.70 31.65	31.78 32.25	1.08 0.60	0.43	14 44 0.24	7 27.30	4.26	14 36 28.68	37 24 48.45	7.11	55.06	H.	9.10	Bessel's Zone, 415.
9 0	30.85 32.00	31.87 32.10	1.02 0.10	0.30	15 8 7.55	7 27.35	4.29	15 0 35.91	37 2 57.73	6.85	49.48	H.	8	Bessel's Zone, 415.
1 2	31.60 32.56	32.10 32.89	0.50 0.33	0.22	16 26 15.07	7 27.53	4.23	16 18 43.31	37 23 30.97	6.10	27.65	H.	9.10	Bessel's Zone, 421.
3 4	31.57 32.40	32.25 32.77	0.68 0.37	0.27	16 21 6.20	7 27.52	4.25	16 13 34.43	38 8 27.06	6.03	—29.22	H.	8	Bessel's Zone, 421.
5 6	32.50 32.95	33.05 33.77	0.55 0.82	0.35	18 39 17.35	7 27.84	4.14	18 31 45.37	38 38 32.03	6.01	+17.84	H.	1	*α* Lyræ.
7 18	26.15 27.81	26.95 29.00	0.80 1.19	0.52	11 23 13.30	7 33.99	4.15	11 15 35.16	38 4 40.16	10.87	—72.45	H.	8	Bessel's Zone, 411.
19 20	26.55 29.07	28.36 30.05	1.81 0.98	0.73	12 35 19.76	7 34.16	4.29	12 27 41.31	37 16 24.01	9.42	73.26	H.	8	Bessel's Zone, 463.
21 22	27.15 29.00	28.70 29.90	1.55 0.90	0.63	12 50 31.36	7 34.20	4.32	12 42 52.84	38 21 14.80	9.03	72.28	H.	6	Can. Ven., (4311.)
23 24	28.00 29.20	29.30 30.90	1.30 1.70	0.79	13 50 42.97	7 34.34	4.17	13 43 4.46	37 23 48.65	7.94	65.50	H.	8	Bessel's Zone, 463.
25 26	28.09 29.85	29.65 30.20	1.56 0.35	0.50	13 55 39.24	7 34.35	4.37	13 48 0.52	37 53 29.93	7.82	64.80	H.	9	Anonymous.
7 8	28.54 29.50	30.64 30.65	2.10 1.15	+0.86	14 50 44.77	7 34.49	4.40	14 43 5.88	38 26 48.30	6.96	54.22	H.	7.8	Bessel's Zone, 415.
9 0	32.33 33.55	32.45 32.75	+ 0.12 — 0.80	—0.18	7 32 47.29	7 55.99	4.25	7 24 47.05	32 13 6.40	13.23	22.89	H.	2.3	*α*² Geminorum.
1 2	33.25 34.70	33.85 35.00	+ 0.60 0.30	+0.24	12 0 17.45	7 56.64	4.24	11 52 16.57	37 35 9.07	10.18	74.74	H.	7	Bessel's Zone, 411.
3 4	33.25 34.70	33.85 35.00	0.60 + 0.30	+0.24	12 0 24.79	7 56.64	4.24	11 52 23.91	37 35 23.32	10.18	74.73	H.	8	Bessel's Zone, 411.
5 6	34.20 34.15	33.65 34.62	— 0.55 + 0.47	—0.02	11 44 48.79	7 56.61	3.85	11 36 48.33	38 46 34.74	10.53	74.69	H.	8.9	Anonymous.
7 8	34.67 37.80	34.39 38.67	— 0.28 + 0.87	+0.16	15 36 14.76	7 57.16	4.18	15 28 13.42	27 14 4.93	7.45	44.49	H.	2	*α* Cor. Bor.
	34.15 36.50	35.13 35.90	+ 0.98 — 0.60	0.10	13 51 6.03	7 56.92	4.04	13 43 5.07	37 23 50.03	7.96	67.07	H.	8	Bessel's Zone, 463.
	34.40 36.34	35.00 36.34	+ 0.60 0.00	+0.16	14 9 43.21	—7 56.96	—4.27	14 1 41.98	37 28 53.41	+ 7.63	—64.12	H.	9	Bessel's Zone, 415.

27. Star of 9th magnitude in company.
29. Wind blowing hard ; star unsteady.
32 & 34. Observed at same time.
35. Single revolutions of micrometer ; star of 9.10 magnitude in company.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVE					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. s.	s.	s.	s.	s.	s.	s.		s.	s.	s.	s.	s.	s.
May 11	1	Bootis, (4825)	E.	S.	13 16 57.3	17.3	37.0	57.2	17.0	37.0	58.0	N.	19.2	41.0	2.0	22.5	43.4	4.2
	2		W.	N.	15 50 23.5	45.0	5.7	27.0	46.8	8.4	29.8	S.	51.0	12.5	32.9	52.1	12.8	32.5
	3	Bessel's Zone, 415 . .	E.	N.	13 29 28.2	50.0	15.0	39.0	3.0	27.0	52.0	S.	28.5	54.5	19.0	45.0	10.0	37.5
	4		W.	S.	15 36 0.0	24.5	52.0	17.0	43.0	8.0	33.5	N.	10.2	35.2	58.8	23.0	47.0	12.0
	5	Bessel's Zone, 415 . .	E.	N.	14 7 16.0	36.0	59.2	21.8	43.8	6.0	29.0	S.	57.8	21.5	44.1	8.0	32.0	57.0
	6		W.	S.	16 23 46.6	9.0	34.1	58.0	21.5	44.4	8.5	N.	37.3	1.0	23.0	45.7	8.0	30.8
	7	Bessel's Zone, 421 . .	E.	N.	14 49 56.0	17.2	40.1	2.2	26.0	48.2	10.8	S.	40.8	4.6	26.0	51.2	15.0	40.4
	8		W.	S.	17 5 27.6	50.0	15.5	40.0	5.0	27.0	52.0	N.	22.2	44.8	7.0	29.2	52.7	16.0
	9	Herculis, (5847) . . .	E.	S.	16 4 32.8	54.2	15.0	36.0	56.2	17.0	40.0	N.	5.2	27.7	49.6	11.5	33.3	55.5
	10		W.	N.	18 30 34.7	57.0	18.8	41.4	3.2	25.0	47.3	S.	13.5	35.2	56.0	16.3	37.8	58.8
	11	α Lyræ	E.	S.	18 2 53.4	35.8	18.8	4.5	48.0	35.5	26.6	N.	50.7	47.4	45.2	42.5	45.5	48.5
	†12		W.	N.	19 2 37.5	44.0	47.8	50.4	49.5	46.0	43.3	S.	7.0	57.5	44.0	30.0	15.5	59.5
12	13	α² Geminorum*	E.	S.	4 56 38.5	58.3	8.3	18.3	28.6	39.0	49.0	N.	49.5	59.8	9.7	20.0	30.0	40.2
	14		W.	N.	10 5 42.5	1.9	12.2	22.0	32.2	42.3	52.5	S.	54.4	4.3	14.2	24.4	34.4	44.4
13	15	Bessel's Zone, 463 . .	E.	N.	11 53 41.0	9.5	40.8	11.2	44.0	16.5	49.3	S.	14.8	53.0	33.2	13.8	56.0	40.0
	†16		W.	S.	12 37 58.0	43.5	26.2	9.8	51.5	30.3	8.5	N.	33.0	6.8	39.6	11.8	43.0	14.2
	17	α Lyræ	E.	N.	18 3 6.0	46.5	32.0	15.5	3.5	49.5	38.5	S.	56.5	53.5	50.0	48.5	50.5	56.0
	18		W.	S.	19 2 49.5	53.0	58.5	1.0	1.0	57.0	52.0	N.	12.5	1.5	48.0	34.0	19.0	3.5
19	19	Can. Ven., (4384) . .	E.	N.	11 33 15.5	31.2	48.8	5.5	23.0	39.0	56.4	S.	1.8	19.4	35.5	53.9	11.0	29.6
	20		W.	S.	14 36 9.5	26.0	44.5	1.5	20.0	37.2	55.0	N.	1.0	18.5	35.3	51.5	8.8	26.0
	21	Can. Ven., (4311) . .	E.	S.	12 1 59.0	30.5	2.2	35.0	8.0	41.5	16.5	N.	33.3	11.0	48.8	23.7	1.8	40.5
	22		W.	N.	13 31 12.5	51.3	30.0	8.8	44.6	21.2	59.4	S.	18.0	52.8	25.5	58.8	32.5	5.0
	23	Anonymous	E.	N.	12 28 18.4	37.2	58.8	19.0	40.2	1.0	21.0	S.	42.2	4.0	26.0	46.8	8.0	31.2
	†24		W.	S.	14 58 34.2	54.5	16.8	38.0	0.2	20.5	41.0	N.	3.5	23.5	44.0	4.5	25.0	45.5
	25	Bessel's Zone, 463 . .	E.	S.	13 8 58.5	34.0	10.5	47.8	24.0	2.7	42.8	N.	18.0	3.5	46.0	28.3	14.2	58.7
	26		W.	N.	14 26 43.6	29.0	13.8	59.8	42.2	25.0	7.5	S.	48.5	28.5	6.6	43.0	21.0	57.5
	27	Bootis, (4906)	E.	S.	13 48 50.6	15.6	40.5	6.0	30.5	55.2	22.0	N.	4.6	31.8	59.0	25.6	52.8	19.5
	28		W.	N.	15 49 56.5	24.6	51.5	18.8	44.0	10.8	38.8	S.	21.6	48.0	13.4	38.8	4.5	29.0
	29	Bessel's Zone, 415 . .	E.	N.	14 5 51.4	24.2	0.0	35.5	11.0	48.8	26.2	S.	55.2	37.2	16.3	59.4	41.8	24.0
	30		W.	S.	15 26 55.0	37.2	20.8	2.8	45.5	24.2	6.3	N.	35.2	13.3	48.5	25.2	0.2	37.0
21	31	β Geminorum†	E.	N.	4 31 18.6	34.8	42.1	51.0	59.0	7.1	15.2	S.	4.0	12.0	20.0	28.2	36.9	44.2
	32		W.	S.	10 54 47.3	3.7	11.5	20.1	28.2	36.8	44.7	N.	33.0	41.0	49.0	57.1	5.8	13.4
	33	α Bootis‡	E.	N.	10 3 6.8	19.6	32.2	38.0	44.8	51.1	57.2	S.	46.7	53.0	59.2	6.0	12.0	24.7
	34		W.	S.	18 28 46.0	59.1	11.7	18.0	24.2	31.0	37.0	N.	26.4	32.5	38.8	45.2	51.0	4.0
	35	Herculis, (5496) . . .	E.	N.	15 20 4.2	26.5	51.0	14.0	38.0	1.0	25.0	S.	58.0	23.0	47.0	12.0	37.0	3.2
	36		W.	S.	17 30 30.4	54.0	20.7	45.0	10.5	34.1	59.0	N.	32.8	57.0	20.0	43.2	7.0	31.2
	37	α Lyræ	E.	N.	18 3 28.0	8.0	54.8	40.5	26.5	11.2	0.8	S.	21.4	18.2	13.8	13.6	15.4	21.2
	38		W.	S.	19 3 7.0	10.2	18.0	20.3	20.0	14.2	12.0	N.	33.2	22.0	7.5	54.2	38.8	25.0
	39	Bessel's Zone, 416 . .	E.	S.	13 19 37.0	54.0	11.0	28.4	45.5	2.0	20.5	N.	30.8	49.8	7.0	24.0	40.6	58.5
	40		W.	N.	16 18 56.2	14.0	31.5	50.0	7.0	25.0	43.5	S.	52.5	11.0	28.0	45.5	3.0	19.0
25	41	Bessel's Zone, 415 . .	E.	S.	13 44 14.5	32.8	51.8	10.6	29.0	47.5	7.2	N.	23.7	43.4	3.0	22.0	41.5	1.0
	42		W.	N.	16 29 16.8	37.0	57.0	16.2	35.0	53.9	14.0	S.	29.6	49.2	8.3	27.0	46.0	4.0

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
May 11	+ 4.206	g 0.147
12	4.206	.152
13	4.206	.144
19	4.206	.126
21	4.206	.127
25	+ 4.206	g 0.133

	EXTRA WIRES.											
	EAST.							WEST.				
	1.					2.		1.				
			h.	m.	s.	m.	s.			h.	m.	s.
* α² Geminorum over extra wires	Tel.	S.	4	55	59.0	56	18.2	Tel.	N.	10	5	1.0
	"	N.	0	0	49.0	0	21.1	"	S.	10	9	44.0
† β Geminorum over extra wires	"	N.	4	30	45.8	31	2.0	"	S.	10	54	14.4
	"	S.	4	34	34.0	34	17.9	"	N.	10	58	2.2
‡ α Bootis over extra wire . .	"	N.	10	2	54.0	..	..	"	S.	18	28	33.3
	"	S.	10	5	50.2	..	..	"	N.	18	31	29.2

LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
N.	S.	Div.	"	H. M. S.	M. S.	S.	H. M. S.	° ' "	S.	"			
34.45 36.57	35.45 36.50	+ 1.00 — 0.07	+0.25	14 36 24.70	—7 57.03	— 4.32	14 28 23.35	37 18 13.46	+ 7.21	—59.05	H.	6.7	Bootis, (4825.)
35.35 36.55	35.30 36.25	0.05 — 0.30	—0.09	14 36 1.05	7 57.03	4.24	14 28 59.78	37 48 54.82	7.18	59.18	H.	9	Bessel's Zone, 415.
35.45 36.37	36.07 37.12	+ 0.62 0.75	+0.35	15 18 33.26	7 57.13	4.19	15 10 31.94	37 38 14.44	6.60	49.32	H.	8	Bessel's Zone, 415.
35.65 36.55	36.45 37.12	0.80 0.57	0.35	16 0 45.98	7 57.23	4.18	15 52 44.57	37 39 19.58	6.20	37.86	H.	8.9	Bessel's Zone, 421.
36.72 37.82	36.82 38.50	0.10 0.68	0.20	17 20 26.29	7 57.43	4.14	17 12 24.72	37 27 18.02	5.73	—12.61	H.	5	Herculis, (5847.)
37.60 38.00	38.15 38.00	0.55 + 0.90	+0.36	18 39 46.88	7 57.62	4.09	18 31 45.17	38 38 33.49	5.76	+15.78	H.	1	α Lyræ.
27.45 29.90	26.75 29.15	— 0.70 0.75	—0.37	7 32 51.25	7 59.90	4.21	7 24 47.14	32 13 6.89	13.24	—22.86	H.	2.3	α² Geminorum.
28.85 29.35	27.00 28.15	1.85 1.20	0.80	12 20 38.24	8 4.55	3.98	12 12 29.71	38 45 23.71	11.61	—75.36	H.	7.8	Bessel's Zone, 463.
30.69 31.38	29.68 30.92	1.01 0.46	0.37	18 39 55.05	8 5.48	4.06	18 31 45.51	38 38 34.27	5.71	+15.27	W.	1	α Lyræ.
34.26 37.25	33.94 36.25	0.32 1.00	0.34	13 6 58.31	8 19.96	4.27	12 58 34.08	36 37 24.55	8.89	—73.66	H.	5	Can. Ven., (4384.)
35.00 36.55	34.60 35.33	0.40 1.22	0.42	12 51 16.76	8 19.93	4.35	12 42 54.48	38 21 17.80	9.18	75.18	H.	6	Can. Ven., (4311.)
35.62 37.30	34.55 36.30	1.07 1.00	0.53	13 46 12.20	8 20.04	4.20	13 37 47.94	37 22 10.89	8.11	69.63	H.	10	Anonymous.
35.92 37.10	35.40 36.10	0.52 1.00	0.40	13 53 14.67	8 20.05	4.30	13 44 50.32	38 28 55.20	7.91	68.90	H.	8.9	Bessel's Zone, 463.
36.50 37.30	35.70 36.70	0.80 0.60	0.36	14 52 51.94	8 20.17	4.18	14 44 27.59	37 54 21.61	6.92	57.71	H.	6	Bootis, (4906.)
36.70 36.70	35.90 37.02	— 0.80 + 0.32	0.12	14 51 30.64	8 20.17	3.98	14 43 6.49	38 26 51.87	6.90	58.08	H.	7.8	Bessel's Zone, 415.
31.43 31.87	30.90 31.82	— 0.53 0.05	0.16	7 44 24.12	8 25.69	4.19	7 35 54.24	28 23 27.73	13.69	25.02	H.	2	β Geminorum.
30.67 36.15	30.17 36.40	— 0.50 + 0.25	—0.07	14 17 11.79	8 26.68	4.20	14 8 40.91	19 59 5.96	8.30	69.17	H.	1	α Bootis.
34.40 35.91	34.82 36.17	0.42 0.26	+0.18	16 28 28.74	8 26.86	4.22	16 19 57.66	37 44 51.45	5.80	—32.46	H.	5	Herculis, (5496.)
36.05 36.50	36.50 36.85	0.45 + 0.35	+0.21	18 40 16.69	8 27.16	4.23	18 31 45.30	38 38 36.68	5.51	+13.16	H.	1	α Lyræ.
28.55 29.05	27.95 28.60	— 0.60 0.45	—0.27	14 51 53.79	8 38.68	4.19	14 43 10.92	36 42 48.17	7.06	—59.30	H.	8.9	Bessel's Zone, 416.
28.60 30.10	28.10 28.90	0.50 — 1.20	—0.44	15 9 18.78	— 8 38.72	— 4.27	15 0 35.79	37 3 3.60	+ 6.77	—55.42	H.	8	Bessel's Zone, 415.

11. Cap on; star tremulous.
12. Cap off; star steadier, but diffuse.
15. Single revolutions of micrometer.
23. Almost too small to observe.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVER W					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
June 15	†1	π Herculis	E.	N.	15 45 47.9	5.1	24.4	42.7	1.1	19.0	38.5	S.	51.2	10.3	28.0	48.0	7.0	27.5
	2		W.	S.	18 33 36.9	55.0	15.0	34.2	53.7	11.9	30.9	N.	43.8	3.2	21.2	39.5	57.5	16.6
	3	Herculis, (5847)	E.	S.	15 59 2.9	24.5	44.9	6.0	27.0	48.0	10.0	N.	35.0	57.0	19.0	40.3	3.0	25.0
	4		W.	N.	18 24 55.4	18.0	40.0	2.5	23.8	45.5	8.0	S.	34.5	55.8	17.0	37.5	58.5	19.0
	†5	κ Lyræ	E.	S.	16 31 55.5	10.0	24.7	40.0	54.5	9.4	25.6	N.	26.0	42.0	57.0	12.5	28.0	42.2
	6		W.	N.	19 57 54.8	12.2	27.8	43.2	58.5	13.9	30.0	S.	31.3	46.7	2.0	16.9	31.9	46.8
	†7	α Lyræ	E.	S.	17 57 28.5	12.5	55.2	41.0	26.2	13.0	3.0	N.	28.5	25.0	22.5	21.2	23.8	27.8
	8		W.	N.	18 56 14.8	24.0	28.0	31.5	31.0	28.0	28.0	S.	49.5	40.0	26.0	11.5	54.5	37.0
21	9	Herculis, (5788)	E.	N.	15 22 35.1	49.5	5.8	21.0	36.2	52.0	7.6	S.	8.0	23.7	38.8	54.5	10.5	27.1
	10		W.	S.	18 43 40.0	54.9	11.0	27.0	42.8	58.5	14.2	N.	14.5	31.0	46.0	1.5	16.5	33.0
	11	π Herculis	E.	S.	15 45 53.5	12.1	30.1	48.6	6.9	25.2	44.2	N.	59.3	19.0	38.0	56.8	16.0	35.0
	12		W.	N.	18 33 41.0	0.5	19.0	38.8	57.1	16.0	35.8	S.	50.8	10.0	28.0	46.0	5.0	22.8
	13	β Lyræ*	E.	S.	16 22 15.8	27.0	37.2	48.2	59.0	9.9	21.0	N.	5.2	16.4	27.2	38.0	49.5	0.5
	14		W.	N.	21 8 50.3	1.5	12.0	23.5	34.1	45.0	56.2	S.	39.7	50.8	1.8	12.5	23.2	34.0
	15	Anonymous	E.	S.	16 50 2.5	21.0	38.6	56.2	13.8	31.2	49.6	N.	2.1	21.0	39.7	57.5	16.0	34.0
	16		W.	N.	19 42 29.5	48.2	6.5	24.8	43.5	1.5	19.8	S.	32.6	51.0	9.8	27.0	45.0	2.5
	17	δ² Lyræ	E.	S.	17 19 37.8	55.7	12.2	30.0	46.8	4.0	22.0	N.	32.6	50.7	8.2	25.7	43.5	1.4
	18		W.	N.	20 19 9.0	27.4	44.5	3.0	20.1	37.7	55.9	S.	5.5	23.8	41.3	58.0	15.8	32.7
	19	ζ¹ Lyræ	E.	N.	17 26 6.2	26.4	48.0	8.8	30.2	51.2	12.5	S.	35.2	57.8	18.5	40.7	2.8	25.8
	20		W.	S.	19 52 23.5	43.5	7.0	29.5	51.1	12.5	35.0	N.	56.5	19.5	40.0	1.5	22.2	43.8
	21	α Lyræ‡	E.	S.	17 57 36.0	19.5	3.3	49.0	34.9	21.0	10.8	N.	38.0	36.2	33.1	32.0	35.5	38.5
	22		W.	N.	18 56 53.0	0.0	3.2	6.5	7.0	3.8	2.0	S.	29.5	18.8	5.8	50.8	37.8	21.0
	†23	61¹ Cygni	E.	N.	20 1 ..	45.0	11.2	37.0	4.2	30.2	57.9	S.	42.5	11.0	37.5	6.5	35.7	5.0
	24		W.	S.	21 57 ..	8.0	37.3	6.5	35.5	2.0	31.2	N.	17.5	44.8	10.8	37.2	3.5	30.3
24	25	Bessel's Zone, 421 . .	E.	N.	15 4 7.5	27.0	48.4	8.8	30.0	50.0	11.1	S.	32.6	55.0	15.6	37.8	59.5	22.1
	26		W.	S.	17 33 5.5	26.2	49.0	10.3	32.0	52.8	14.8	N.	37.5	58.5	19.5	39.8	0.5	22.0
	27	Anonymous	E.	S.	15 16 20.5	46.5	13.5	41.5	9.0	36.5	4.4	N.	58.2	28.8	58.0	27.5	57.4	28.8
	28		W.	N.	17 6 17.0	46.2	17.5	47.5	17.0	46.0	16.5	S.	11.3	40.3	7.5	35.0	1.8	28.5
	29	Bessel's Zone, 421 . .	E.	S.	15 39 3.4	27.0	50.1	15.8	39.0	4.0	29.5	N.	9.5	35.1	0.5	25.8	52.5	18.0
	30		W.	N.	17 44 13.3	40.0	5.6	32.0	57.3	22.8	49.0	S.	28.3	53.0	18.0	42.0	6.5	30.2
	31	Bessel's Zone, 421 . .	E.	N.	15 57 45.0	3.0	22.5	41.7	0.5	19.5	..	S.	..	13.0	32.8	52.0	11.8	32.0
	32		W.	S.	18 40 50.8	9.5	30.0	50.0	9.5	28.1	..	N.	..	23.0	41.7	0.9	20.0	40.0
	†33	Bessel's Zone, 480 . .	E.	N.	16 30 10.5	25.5	43.0	59.5	15.8	31.0	48.2	S.	51.7	8.8	25.0	42.0	58.9	16.4
	34		W.	S.	19 40 11.0	26.5	44.0	1.0	17.5	34.0	51.0	N.	55.8	12.0	28.5	44.8	0.9	18.0
	35	Anonymous	E.	S.	16 40 9.8	33.5	56.0	20.0	44.0	8.0	31.5	N.	8.1	33.5	57.8	22.0	47.8	12.0
	36		W.	N.	18 50 13.2	38.0	3.0	28.8	53.0	17.5	43.0	S.	19.0	43.5	7.0	30.0	54.0	16.5
	37	α Lyræ	E.	S.	17 57 44.6	28.2	11.1	57.4	43.0	30.0	20.0	N.	44.5	41.2	38.9	38.0	40.0	44.8
	38		W.	N.	18 57 0.8	9.0	13.8	16.0	15.3	11.2	9.1	S.	35.8	25.8	13.7	58.7	44.8	28.1
July 9	39	Herculis, (5496) . . .	E.	N.	15 14 58.8	20.2	44.6	8.0	31.2	54.0	19.0	S.	53.4	19.0	43.4	8.2	33.0	59.0
	40		W.	S.	17 25 11.2	35.4	1.0	26.5	51.0	15.5	41.0	N.	15.0	39.0	2.0	25.8	48.8	13.8
10	41	Herculis, (5788) . . .	E.	N.	15 22 20.5	51.4	21.6	36.0	51.8	7.6	22.8	S.	26.0	42.0	57.8	14.5	29.6	1.2
	42		W.	S.	18 43 19.4	51.8	23.8	39.0	55.0	10.8	27.0	N.	30.4	46.0	1.0	17.4	31.5	2.2

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
June 15	+ 4.206	g 0.060
21	4.206	.062
24	4.206	.100
July 9	+ 5.062	g 0.070

EXTRA WIRES.

	EAST.				WEST.		
		1.	2.	3.		1.	2.
		h. m. s.	m. s.	m. s.		h. m. s.	m. s.
* β Lyræ over extra wires . .	Tel. S.	16 21 11.7	21 32.8	21 54.8	Tel. S.	21 7 45.0	8 6.0
	" N.	16 26 17.3	25 55.5	25 33.0	" N.	21 12 49.5	12 28.5
‡ α Lyræ over extra wires . .	" S.	17 53 35.0	54 50.8	56 12.7	" N.	18 48 24.7	51 38.2
	" N.	18 20 15.5	17 2.0	14 12.2	" S.	19 15 4.0	13 49.5

LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
N.	S.	*Div.*	″	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	S.	″			
37.64 38.86	38.23 38.89	+ 0.59 0.03	+0.16	17 12 11.03	−2 23.07	−4.26	17 9 43.70	36 59 16.04	+ 5.41	−23.57	H.	4	π Herculis.
37.85 38.90	37.90 38.85	+ 0.05 − 0.05	0.00	17 14 51.63	2 23.07	4.22	17 12 24.34	37 27 28.19	5.40	22.71	H.	5	Herculis, (5847.)
37.65 39.20	38.20 38.65	+ 0.55 − 0.55	0.00	18 16 58.01	2 23.13	4.29	18 14 30.59	36 0 1.91	5.36	− 1.54	H.	5	κ Lyræ.
38.75 38.74	38.87 39.04	+ 0.12 + 0.30	+0.10					38 38 44.03	5.05	+ 5.68	H.	1	α Lyræ.
43.95 45.20	42.85 44.95	− 1.10 0.25	−0.35	17 5 11.08	2 29.78	4.14	17 2 37.16	36 8 27.64	5.56	−27.55	H.	5	Herculis, (5788.)
44.05 45.32	43.00 44.82	1.05 0.50	0.40	17 12 17.49	2 29.79	4.15	17 9 43.55	36 59 18.10	5.49	−24.29	H.	4	π Herculis.
44.65 46.10	43.23 46.12	− 1.42 + 0.02	0.36	18 47 0.64	2 29.89	4.13	18 44 26.62	33 11 22.96	5.70	+ 6.82	H.	3	β Lyræ.
44.60 45.75	43.55 45.10	− 1.05 0.65	0.44	18 18 41.33	2 29.86	4.17	18 16 7.30	36 52 46.22	5.54	− 2.76	H.	9	Anonymous.
44.60 46.10	44.15 45.10	0.45 1.00	0.37	18 51 44.02	2 29.90	4.25	18 49 9.87	36 42 31.12	5.25	+ 8.53	H.	5	δ^2 Lyræ.
44.85 46.10	44.05 45.10	0.80 1.00	0.47	18 42 5.02	2 29.88	4.23	18 39 30.91	37 26 59.59	5.12	− 5.35	H.	5	ζ^1 Lyræ.
45.13 45.75	44.45 44.75	0.68 1.00	0.44	18 34 19.91	2 29.87	4.29	18 31 45.75	38 38 45.73	4.98	+ 3.81	H.	1	α Lyræ.
46.03 46.97	45.18 46.47	0.85 − 0.50	−0.35	21 2 37.02	2 30.03	4.25	21 0 2.74	37 59 51.07	7.48	+61.64	H.	6	61^1 Cygni.
41.87 42.47	42.50 43.15	+ 0.63 0.68	+0.34	16 21 24.15	2 36.58	4.20	16 18 43.37	37 23 45.23	5.81	−42.07	H.	9.10	Bessel's Zone, 421.
41.70 42.80	42.60 42.78	+ 0.90 − 0.02	0.24	16 15 7.74	2 36.57	4.33	16 12 26.84	38 4 46.31	5.80	44.34	H.	9.10	Anonymous.
41.70 42.60	42.60 43.10	+ 0.90 0.50	0.36	16 44 58.84	2 36.63	4.26	16 42 17.95	37 50 19.15	5.50	34.96	H.	8	Bessel's Zone, 421.
41.90 43.25	42.60 44.00	0.70 0.75	0.37	17 21 51.08	2 36.68	4.20	17 19 10.20	37 5 41.73	5.32	23.03	H.	7.8	Bessel's Zone, 421.
42.10 43.97	42.85 44.65	0.75 0.68	0.37	18 7 21.67	2 36.76	4.21	18 4 40.70	36 26 28.21	5.23	7.60	H.	7	Bessel's Zone, 480.
42.05 43.65	42.95 44.20	0.90 0.55	0.37	17 48 25.27	2 36.73	4.25	17 45 44.29	37 45 16.05	5.09	−14.10	H.	9	Anonymous.
42.59 42.96	43.46 45.02	0.87 + 2.06	+0.77	18 34 27.42	2 36.80	3.98	18 31 46.64	38 38 46.76	4.96	+ 2.87	H.	1	α Lyræ.
40.47 43.28	40.05 42.30	− 0.42 0.98	−0.36	16 23 17.04	3 12.88	5.13	16 20 59.03	37 45 4.44	5.88	−45.18	M.	6	Herculis, (5496.)
38.55 42.30	38.35 41.25	0.20 − 1.05	−0.32	17 5 56.61	−3 14.57	−5.13	17 2 36.91	36 8 32.03	+ 5.63	−34.41	M.	5	Herculis, (5788.)

1. Salmon colored.
5. Wire A rejected in the reduction.
7. Taken by reflection in the West.
23. Hazy; star indistinct and diffuse; lamps burning badly.
33. Flying clouds; bad observation.

Assumed Latitude 38° 53′ 38″.80 North.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES. A.	B.	C.	D.	E.	F.	G.	Telescope.	TIMES OF TRANSIT OVER W G.	F.	E.	D.	C.	B.
					H. M. S.	s.	s.	s.	s.	s.	s.		s.	s.	s.	s.	s.	s.
July 10	1	Bessel's Zone, 421 . . .	E.	S.	16 23 53.6	29.0	4.8	43.6	20.2	58.2	38.7	N.	18.4	2.0	45.8	30.4	15.8	1.5
	2		W.	N.	17 40 37.8	25.8	11.4	56.8	39.5	23.4	6.4	S.	47.5	27.0	6.8	43.5	21.4	56.8
	3	Bessel's Zone, 421 . . .	E.	N.	16 0 54.5	35.0	22.8	8.2	55.8	44.2	32.4	S.	59.0	58.4	54.6	55.2	58.8	9.5
	4		W.	S.	16 59 5.2	12.0	23.6	27.0	27.6	25.4	22.8	N.	48.0	38.8	26.0	12.7	58.0	46.0
14*	5	Bessel's Zone, 480 . . .	E.	N.	15 39 0.4	29.8	58.6	11.8	28.0	43.0	57.8	S.	55.0	10.0	24.5	41.0	54.4	25.5
	6		W.	S.	19 8 48.5	19.2	49.0	4.0	18.4	34.2	49.2	N.	46.4	1.4	15.0	30.5	46.0	14.8
	7	Bessel's Zone, 480 . . .	E.	S.	15 59 52.0	23.0	38.0	53.0	9.2	24.2	39.1	N.	16.0	31.6	47.0	2.4	18.2	35.0
	8		W.	N.	19 19 12.5	42.0	0.0	15.0	31.0	46.6	1.5	S.	38.0	53.0	8.9	24.6	40.4	56.2
	9	Bessel's Zone, 421 . . .	E.	S.	16 46 29.8	19.2	9.0	2.2	54.8	50.0	49.2	N.	5.0	16.0	32.2	52.0	19.8	52.5
	10		W.	N.	17 32 46.5	31.0	4.8	34.0	53.6	8.5	22.0	S.	37.5	34.8	30.4	23.0	17.2	7.6
15*	11	Anonymous	E.	S.	15 51 3.0	39.6	16.8	55.0	32.4	12.4	52.8	N.	38.0	20.6	3.0	49.5	32.0	22.0
	12		W.	N.	17 6 17.0	6.6	52.2	39.8	24.2	9.8	53.4	S.	37.5	15.2	55.4	33.5	13.4	48.8
Aug. 8*	13	ϑ Lyræ	E.	N.	18 7 ..	..	..	23.8	47.2	12.8	38.0	S.	16.5	42.8	8.6	34.8	..	..
	14		W.	S.	20 10 ..	..	..	51.5	17.6	42.9	9.8	N.	48.0	14.0	38.4	3.3	..	..
	15	Cygni, (6771)	E.	S.	18 12 36.0	54.6	12.1	31.0	49.0	7.0	26.2	N.	41.5	1.0	19.2	37.5	59.0	17.3
	16		W.	N.	21 0 15.3	34.0	53.0	12.4	30.9	50.0	9.0	S.	24.0	43.0	1.5	19.5	38.0	56.2
	17	Cygni, (6849)	E.	S.	18 52 0.2	27.1	53.5	21.5	48.5	16.5	45.5	N.	40.0	9.5	38.8	8.5	39.3	8.5
	18		W.	N.	20 41 27.5	58.2	28.4	58.5	27.8	57.0	27.5	S.	21.4	50.5	18.0	45.0	13.3	39.9
11	19	β Lyræ†	E.	S.	16 19 33.3	54.5	5.5	16.0	27.0	38.0	49.0	N.	55.8	6.5	17.3	28.5	39.1	50.5
	20		W.	N.	21 6 1.5	23.0	33.9	45.0	56.2	6.9	17,9	S.	24.5	35.1	46.0	57.0	7.5	18.5
	21	κ Lyræ	E.	N.	16 29 43.0	57.2	13.0	28.0	43.0	58.0	13.7	S.	11.9	27.5	42.5	58.0	13.5	30.0
	22		W.	S.	19 55 36.8	50.8	7.5	22.8	38.0	53.0	9.3	N.	8.0	23.0	38.5	53.1	8.6	24.0
	23	Anonymous	E.	S.	17 51 21.6	41.0	0.0	19.9	38.5	57.4	17.9	N.	37.0	57.0	17.2	36.5	56.8	16.9
	24		W.	N.	20 31 0.5	21.0	41.0	1.0	21.0	41.0	1.2	S.	20.0	40.5	59.0	18.5	37.5	57.0
	25	Cygni, (6937)	E.	S.	18 26 ..	9.0	24.4	41.0	56.5	13.0	..	N.	..	53.2	9.9	26.0	43.0	59.5
	26		W.	N.	21 37 ..	52.5	9.5	26.0	42.0	58.8	..	S.	..	38.5	54.5	10.0	26.5	42.5
	27	Anonymous	E.	N.	19 26 ..	..	..	6.5	30.0	53.5	18.5	S.	52.8	18.5	43.0	8.8	..	..
	28		W.	S.	21 33 ..	..	..	30.5	56.0	20.5	47.2	N.	20.9	45.9	10.0	33.0	..	..
	29	α Lacertæ	E.	S.	20 43 6.7	25.4	43.5	2.0	20.0	38.4	58.0	N.	12.8	32.0	51.0	9.5	29.0	48.4
	30		W.	N.	22 30 51.8	11.0	30.8	49.8	8.5	26.5	46.2	S.	1.5	20.7	38.9	57.2	15.9	34.1
12	31	α Bootis	E.	S.	9 54 32.4	44.9	57.7	10.1	16.5	23.0	29.2	N.	34.0	40.1	47.0	53.1	5.5	18.4
	32		W.	N.	18 20 9.0	21.5	35.0	47.0	54.0	0.0	7.0	S.	11.0	17.0	23.0	30.0	42.5	55.0
13	33	Anonymous	E.	S.	17 47 11.3	23.0	34.8	46.3	53.0	9.5	..	N.	..	21.4	33.0	44.3	56.4	8.2
	34		W.	N.	22 13 42.9	54.5	6.1	18.4	30.0	42.0	..	S.	..	53.0	4.9	16.1	28.0	39.5
	35	Cygni, (6722)	E.	N.	17 56 33.0	49.0	6.3	23.3	40.1	57.0	14.4	S.	20.1	38.0	54.6	12.2	29.5	48.0
	36		W.	S.	20 59 54.5	11.5	29.5	46.8	4.0	21.0	38.8	N.	45.2	2.5	19.0	36.2	52.8	10.2
	37	Cygni, (6937)	E.	N.	18 25 54.2	9.3	26.1	42.2	58.8	14.5	31.0	S.	34.7	51.2	7.5	24.0	40.6	58.0
	38		W.	S.	21 37 37.8	53.5	10.8	28.0	44.9	0.6	17.5	N.	21.0	37.7	53.2	9.8	26.0	42.5
	39	Cygni, (6990)	E.	N.	18 59 9.7	29.5	51.5	13.2	35.0	56.8	19.4	S.	46.8	9.3	32.2	54.9	17.8	42.1
	40		W.	S.	21 19 36.8	58.5	22.7	45.8	8.5	31.0	54.0	N.	20.7	43.4	4.9	27.0	48.3	11.8
	†41	Bessel's Zone, 314 . . .	E.	S.	19 16 58.2	30.0	1.5	33.2	5.2	37.0	11.0	N.	24.2	0.2	35.0	10.0	46.5	23.0
	42		W.	N.	20 50 1.4	37.9	14.0	51.2	26.0	1.3	37.5	S.	51.5	24.0	56.8	28.3	0.1	31.5

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
July 10	+ 5.062	g 0.070
14	5.062	l 0.087
15	5.062	l 0.087
Aug. 8	5.062	g 0.012
11	5.062	.011
12	5.062	.005
13	+ 5.062	g 0.000

† β Lyræ over extra wires . . . . . .

EXTRA WIRES.

	EAST. 1.	EAST. 2.		WEST. 1.	
	h. m. s.	m. s.		h. m. s.	m.
Tel. S.	16 18 50.5	19 11.5	Tel. N.	21 5 17.4	5
" N.	16 23 56.0	23 34.3	" S.	21 10 22.5	10

L READINGS.		Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
ns.	Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
s.	Div.	″	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	s.	″			
39.04 40.06	— 0.59 0.48	—0.28	17 7 43.18	—3 14.58	—5.04	17 4 23.56	38 29 32.37	+ 5.30	—32.12	M.	7.8	Bessel's Zone, 421.
38.76 39.30	0.64 0.72	0.35	16 37 10.87	—3 14.54	5.11	16 33 51.22	38 39 15.39	5.61	41.53	M.	8	Bessel's Zone, 421.
45.78 46.60	1.97 3.40	1.40	17 26 52.09	+0 15.60	5.16	17 27 2.53	35 53 24.40	5.49	25.59	M.	8	Bessel's Zone, 480.
46.15 46.93	1.90 3.07	1.30	17 42 8.94	0 15.62	6.00	17 42 18.56	36 11 19.43	5.35	20.66	M.	8	Bessel's Zone, 480.
46.51 46.35	2.20 2.60	1.26	17 18 41.64	0 15.59	5.18	17 18 52.05	38 43 43.70	5.67	28.49	M.	7.8	Bessel's Zone, 421.
50.62 50.10	1.15 — 2.27	—0.90	16 34 14.37	+0 17.60	5.29	16 34 26.68	38 30 25.76	5.67	—42.35	M.	9	Anonymous.
12.17 13.73	+ 0.47 0.16	+0.17	19 11 13.12	—0 3.61	5.10	19 11 4.41	37 52 7.98	5.03	+ 2.12	H.	5	ϑ Lyræ.
12.60 14.23	+ 0.90 — 0.02	0.24	19 38 55.25	0 3.62	5.14	19 38 46.49	36 59 30.25	5.17	11.23	H.	5	Cygni, (6771.)
12.95 14.15	+ 0.20 0.00	+0.05	19 50 33.60	0 3.62	5.09	19 50 24.89	38 5 12.49	5.05	+14.65	H.	5	Cygni, (6849.)
16.21 18.65	+ 0.06 — 0.70	—0.17	18 44 36.54	0 4.52	5.10	18 44 26.92	33 11 37.00	5.71	— 6.76	H.	3	β Lyræ.
16.45 18.85	0.00 0.70	0.18	18 14 40.54	0 4.51	5.11	18 14 30.92	36 0 17.47	5.42	—16.60	H.	5	κ Lyræ.
17.59 19.05	0.61 0.35	0.25	19 13 48.93	0 4.52	5.04	19 13 39.37	37 10 14.87	5.15	+ 2.26	H.	8	Anonymous.
17.92 18.40	0.15 — 0.80	0.25	20 3 55.63	0 4.52	5.11	20 3 46.00	36 23 45.00	5.34	17.98	H.	5	Cygni, (6937.)
19.00 18.68	+ 0.20 — 0.32	—0.04	20 31 49.72	0 4.53	5.12	20 31 40.07	37 48 6.66	5.30	26.31	H.	7	Anonymous.
19.05 19.45	— 0.05 + 0.40	+0.09	22 9 29.61	0 4.54	5.02	22 9 20.05	36 59 22.17	6.37	+51.01	H.	4.5	α Lacertæ.
13.81 16.16	0.40 0.04	0.11	14 8 50.10	0 5.07	5.07	14 8 39.96	19 59 13.16	9.19	—77.04	H.	1	α Bootis.
14.20 16.85	2.40 1.83	1.12	20 2 1.35	0 5.07	5.09	20 1 51.19	33 2 21.83	5.67	19.75	H.	7	Anonymous.
15.05 16.50	2.98 1.80	1.25	19 30 29.58	0 5.07	6.01	19 30 18.50	36 36 45.65	5.25	7.11	H.	6	Cygni, (6722.)
15.35 16.53	2.90 1.83	1.24	20 3 55.97	0 5.07	5.15	20 3 45.75	36 23 45.07	5.28	17.54	H.	5	Cygni, (6937.)
15.50 16.50	2.35 1.80	1.09	20 12 20.26	0 5.07	5.12	20 12 10.07	37 33 48.73	5.23	19.96	H.	5.6	Cygni, (6990.)
15.60 16.40	2.25 + 1.70	+1.04	20 8 0.68	—0 5.07	—5.15	20 7 50.46	38 18 34.34	+ 4.12	+18.65	H.	8.9	Bessel's Zone, 314.

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•July 14 & 15. Observed with Chron. No. 2033. Both nights bad for observing.

• August 8. Resumed Chron. No. 1615.

41. Triple, forming a right angled triangle; A. (8.9) white, B. (9) red, C. (10) faint red.

Assumed Latitude 38° 53′ 38″.80 North.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVER					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
Sept. 14	1	Cygni, (7505)	E.	N.	20 23 33.5	56.0	21.6	45.9	10.7	34.8	0.5	S.	39.9	6.6	31.5	57.5	24.0	51.0
	2		W.	S.	22 27 47.1	12.0	39.8	6.0	31.5	57.0	23.8	N.	3.0	28.6	52.4	17.5	42.0	7.2
	3	α Andromedæ	E.	S.	20 46 23.0	39.4	55.5	3.3	11.1	19.5	27.8	N.	33.9	42.0	50.1	58.1	6.0	22.6
	4		W.	N.	3 12 20.6	37.0	52.8	1.0	9.0	17.5	25.5	S.	32.0	40.0	47.7	56.0	4.0	20.0
	5	Bessel's Zone, 379	E.	N.	21 5 2.5	19.4	39.2	57.7	16.0	34.0	53.5	S.	8.3	28.2	47.2	6.2	26.0	46.0
	6		W.	S.	23 49 56.5	14.5	35.1	55.1	14.5	33.0	53.0	N.	7.3	27.0	45.4	4.0	22.8	42.0
	7	Lacertæ, (9701)	E.	S.	21 40 2.8	32.9	2.9	34.5	4.7	34.7	8.0	N.	15.5	49.0	23.0	56.1	31.5	5.5
	8		W.	N.	23 17 8.0	44.0	18.5	52.8	26.8	0.0	34.5	S.	41.0	13.8	45.0	15.0	45.7	15.9
	9	μ Andromedæ	E.	N.	23 38 16.0	36.0	0.5	22.8	45.1	7.5	31.5	S.	2.0	26.5	49.5	14.0	38.2	3.0
	10		W.	S.	1 53 8.0	31.3	56.5	20.5	44.5	7.5	32.0	N.	2.2	26.0	48.9	11.0	34.0	57.0
	11	Persei, (871)	E.	S.	1 31 16.4	38.7	0.6	23.8	46.5	9.4	33.5	N.	6.4	30.4	53.5	18.8	43.0	7.0
	12		W.	N.	3 45 21.6	46.5	10.5	35.0	58.1	21.9	46.4	S.	19.9	44.0	6.0	28.6	51.5	13.6
16†	13	α Bootis	E.	S.	9 54 52.5	4.6	17.2	30.0	36.1	42.2	49.1	N.	54.0	0.5	6.2	13.0	25.5	38.6
	14		W.	N.	18 20 30.0	42.0	55.0	7.5	14.0	20.5	27.0	S.	31.8	38.0	44.3	51.0	3.0	16.0
	15	Cygni, (6771)	E.	S.	18 13 0.4	18.2	36.0	55.0	13.0	31.3	50.7	N.	6.2	25.0	44.6	2.8	22.6	41.2
	16		W.	N.	21 0 34.6	54.0	11.9	31.5	50.5	10.6	28.5	S.	43.0	2.0	20.5	38.6	57.6	15.6
	17	Cygni, (6849)	E.	N.	18 52 26.7	53.2	20.9	48.8	16.0	43.2	12.0	S.	4.8	35.0	3.3	33.6	4.1	35.5
	18		W.	S.	20 41 45.2	16.0	48.3	17.2	47.4	16.8	47.2	N.	37.5	7.5	35.0	2.0	29.8	57.5
	19	Anonymous	E.	N.	19 25 18.4	40.9	5.9	30.0	54.0	17.1	42.0	S.	18.7	44.0	8.2	34.1	0.3	26.4
	20		W.	S.	21 32 30.2	54.9	21.8	46.9	12.7	37.1	3.4	N.	39.0	4.0	28.0	52.0	16.0	40.2
	21	Bessel's Zone, 313	E.	S.	19 45 56.2	13.1	30.2	47.6	5.0	21.0	..	N.	..	7.0	24.8	42.0	0.5	17.4
	22		W.	N.	22 45 43.8	2.0	19.6	36.9	54.0	12.2	..	S.	..	57.0	15.1	31.5	48.8	7.0
	23	Bessel's Zone, 314	E.	S.	21 16 ..	..	..	..	1.0	43.5	35.0	N.	19.0	14.5	17.0	..	..	..
	24		W.	N.	21 47 ..	..	..	..	9.0	3.0	5.0	S.	52.5	40.5	23.0	..	..	..
20	†25	ζ Cygni	E.	S.	18 4 ..	50.0	7.2	15.6	24.1	33.0	41.7	N.	52.2	0.0	8.7	17.2	26.0	43.0
	26		W.	N.	0 6 ..	37.1	54.0	2.9	11.6	20.4	29.0	S.	39.2	47.5	56.5	5.0	13.4	30.5
	27	Cygni, (6937)	E.	S.	18 26 28.4	44.5	0.5	17.0	32.5	48.8	5.5	N.	10.0	27.3	43.0	59.4	16.0	33.0
	28		W.	N.	21 38 7.5	24.5	40.8	57.7	14.0	30.2	47.2	S.	53.3	10.0	26.0	42.0	58.0	13.6
	29	Anonymous	E.	N.	19 19 47.0	11.3	38.0	3.0	30.0	54.0	21.0	S.	4.0	31.8	58.0	25.9	53.0	22.8
	30		W.	S.	21 18 28.0	54.5	24.2	52.0	19.9	45.7	14.0	N.	55.5	22.0	47.0	14.0	38.7	4.8
	31	τ Cygni	E.	N.	19 52 14.2	33.0	54.0	15.0	35.0	55.8	17.0	S.	39.0	1.0	22.5	44.2	5.0	27.2
	32		W.	S.	22 21 3.5	23.5	46.4	8.8	30.0	50.5	12.5	N.	34.5	55.7	16.0	37.0	57.9	19.0
	†33	Bessel's Zone, 314	E.	S.	20 18 2.0	31.0	59.0	28.8	57.5	26.0	56.0	N.	56.2	28.5	59.0	31.0	3.0	35.0
	34		W.	N.	22 1 53.0	27.0	58.0	31.0	1.6	33.5	5.0	S.	5.2	37.0	5.5	34.0	3.0	32.0
	†35	Bessel's Zone, 314	E.	S.	20 18 9.5	37.5	6.3	36.0	4.4	32.6	2.3	N.	2.0	34.5	5.0	36.2	8.5	40.8
	36		W.	N.	22 2 23.0	56.0	28.0	59.0	31.0	3.0	34.0	S.	35.0	4.0	32.5	1.0	30.0	58.0
	37	α Lacertæ	E.	S.	20 43 43.5	0.7	19.5	38.3	56.6	14.5	34.0	N.	48.4	8.0	27.0	46.0	5.2	24.4
	38		W.	N.	23 31 23.0	42.0	1.0	20.5	39.0	58.3	17.8	S.	32.5	51.5	10.1	28.8	47.0	5.0
	†39	Anonymous	E.	N.	20 54 ..	..	..	27.0	57.0	28.3	0.0	S.	3.0	37.2	9.5	42.8	..	..
	40		W.	S.	22 33 ..	..	..	5.7	38.5	12.0	46.0	N.	48.5	21.4	51.0	21.0	..	..
	41	ζ Cygni	E.	N.	18 4 37.7	55.1	12.1	20.5	29.3	38.0	..	S.	..	3.0	11.3	20.9	29.0	46.2
	42		W.	S.	0 6 23.3	41.5	59.0	7.0	16.0	24.5	..	N.	..	50.0	58.1	7.0	15.5	32.3

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Sept. 14	— 0.622	g 0.094
16	0.622	0.133
20	— 0.622	g 0.186

† Sept. 16. Mounted the level that came with instrument. 1 div. = 1″.5.
21. Single revolutions of micrometer.

LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
N.	S.	*Div.*	"	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	S.	″			
7.83 8.90	8.43 9.76	+ 0.60 0.86	+1.00	21 29 1.72	—0 29.32	+0.70	21 28 33.10	37 51 16.78	+ 5.90	+32.64	H.	5.6	Cygni, (7505.)
8.00 11.10	8.80 11.82	0.80 0.72	1.04	0 0 59.67	29.52	0.61	0 0 30.76	28 14 47.95	7.93	56.30	H.	1	α Andromedæ.
8.20 9.67	8.90 10.07	0.70 0.40	0.75	22 30 0.67	29.32	0.54	22 29 31.89	37 3 14.93	6.49	45.52	H.	7.8	Bessel's Zone, 379.
8.73 9.47	9.05 10.00	0.32 0.53	0.58	22 32 54.59	29.32	0.71	22 32 25.98	38 15 29.21	6.46	45.95	H.	5	Lacertæ, (7901.)
9.46 10.27	10.15 11.10	0.69 0.83	1.04	0 48 47.07	29.58	0.70	0 48 18.19	37 40 4.83	8.38	60.22	H.	5	μ Andromedæ.
10.13 11.50	11.00 12.20	0.87 0.70	1.07	2 41 26.36	29.74	0.57	2 40 57.69	37 40 55.96	10.30	+54.71	H.	4.5	Persei, (871.)
18.05 13.97	18.95 17.27	0.90 3.30	1.58	14 9 10.30	32.02	0.68	14 8 38.96	19 59 12.31	9.67	—74.94	H.	1	α Bootis.
14.10 17.80	16.40 19.92	2.30 2.12	1.66	19 39 17.16	32.69	0.59	19 38 45.06	36 59 38.57	5.74	+ 3.11	H.	5	Cygni, (6771.)
15.50 17.85	17.72 19.45	2.22 1.60	1.43	19 50 55.37	32.71	0.49	19 50 23.15	38 5 21.25	5.59	6.03	H.	5	Cygni, (6849.)
16.39 18.75	18.25 20.50	1.86 1.75	1.35	20 32 10.75	32.79	0.60	20 31 38.56	37 48 17.74	5.73	17.78	H.	7	Anonymous.
17.05 19.65	19.40 21.55	2.35 1.90	1.60	21 18 9.65	32.89	0.56	21 17 37.32	36 42 7.93	5.96	29.78	H.	7.8	Bessel's Zone, 313.
18.50 19.10	19.90 21.00	1.40 1.90	1.23	21 34 12.55	32.91	1.00	21 33 40.64	38 49 40.80	5.85	33.38	H.	8	Bessel's Zone, 314.
11.03 16.65	15.60 22.27	4.57 5.62	3.83	21 7 10.19	44.25	0.67	21 6 26.61	29 36 26.68	6.62	26.78	H.	3.4	ζ Cygni.
11.10 15.00	15.60 21.47	4.50 6.47	4.12	20 4 28.95	44.04	0.85	20 3 45.76	36 23 54.63	5.87	9.76	H.	5	Cygni, (6937.)
12.45 15.00	17.03 20.90	4.58 5.90	3.93	20 22 38.48	44.12	0.87	20 21 55.23	37 56 47.17	5.70	14.46	H.	7.8	Anonymous.
13.50 16.00	18.40 21.47	4.90 5.47	3.89	21 9 25.90	44.26	0.70	21 8 42.34	37 23 59.34	5.90	26.66	H.	4.5	τ Cygni.
14.77 15.63	18.70 21.45	3.93 5.82	3.66	21 14 0.92	44.27	1.04	21 13 17.69	38 10 4.42	5.85	27.72	H.	8	Bessel's Zone, 314.
14.77 15.63	18.70 21.45	3.93 5.82	3.66	21 14 18.23	44.27	1.04	21 13 35.00	38 9 45.92	5.85	27.78	H.	10	Bessel's Zone, 314.
15.00 16.70	19.67 21.94	4.67 5.24	3.72	22 10 3.18	44.45	0.70	22 9 19.43	36 59 32.55	6.34	40.26	H.	4.5	α Lacertæ.
14.75 16.05	19.65 21.55	4.90 5.50	3.90	21 46 24.31	44.38	0.76	21 45 40.69	38 14 29.85	6.04	35.25	H.	9	Anonymous.
12.63 19.25	13.53 19.05	+ 0.90 — 0.20	+0 26	21 7 13.82	—0 48.86	+1.41	21 6 26.37	29 36 25.82	+ 6.64	+26.63	H.	3.4	ζ Cygni.

33 & 35. Observed at same time.
39. The minutes refer to the first and last wires observed.

Assumed Latitude 38° 53′ 38″.80 North.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES. A.	B.	C.	D.	E.	F.	G.	Telescope.	TIMES OF TRANSIT OVER G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
Sept. 21	†1	Cygni, (6771)	E.	S.	18 13 17.0	34.9	53.0	11.5	30.0	48.1	7.2	N.	23.0	42.3	1.5	20.0	39.5	58.1
	2		W.	N.	21 0 49.8	8.0	27.0	47.0	5.5	24.5	44.0	S.	58.0	17.0	36.0	54.0	12.5	30.0
	3	Cygni, (6937)*	E.	N.	18 26 33.9	49.1	6.0	22.0	38.2	53.3	11.0	S.	13.6	30.5	46.8	3.0	20.0	37.5
	4		W.	S.	21 38 11.3	27.1	44.8	2.0	17.9	34.3	51.0	N.	54.1	10.7	26.9	43.8	0.0	16.8
	5	λ Cygni†	E.	S.	18 56 6.0	20.5	35.0	50.8	5.4	20.2	35.5	N.	36.3	52.0	7.5	22.0	37.8	53.0
	6		W.	N.	22 24 23.0	37.8	52.8	8.3	23.2	38.5	54.0	S.	54.5	9.2	24.5	39.5	54.2	8.6
	7	Bessel's Zone, 487 . .	E.	N.	19 25 11.0	44.0	21.6	57.0	32.0	7.3	45.5	S.	14.8	55.5	33.8	15.8	56.6	41.5
	8		W.	S.	20 47 13.5	54.5	38.8	20.8	1.4	41.2	21.5	N.	50.1	27.7	3.0	38.9	15.0	51.1
	†9	Bessel's Zone, 314 . .	E.	S.	19 49 39.5	8.0	37.0	7.0	37.9	8.4	39.0	N.	47.4	21.5	57.0	30.5	8.0	46.5
	10		W.	N.	20 38 59.0	36.5	15.0	50.5	26.0	1.8	34.2	S.	39.0	11.2	42.4	12.0	42.2	12.8
	11	Anonymous	E.	N.	20 4 26.0	49.0	16.0	41.0	7.5	32.0	59.0	S.	42.0	9.2	36.0	2.8	31.0	59.2
	12		W.	S.	22 3 7.0	34.0	3.0	31.0	58.5	25.0	53.2	N.	34.8	2.0	27.0	32.2	18.5	45.0
	13	Anonymous	E.	S.	20 18 ..	41.4	7.0	35.0	0.5	28.7	56.5	N.	50.4	19.8	48.1	17.2	47.0	16.8
	14		W.	N.	22 10 ..	57.5	26.5	56.5	25.3	54.8	24.0	S.	17.0	45.5	12.0	39.5	6.8	32.2
	15	Bessel's Zone, 314 . .	E.	S.	21 15 38.0	58.5	22.0	45.0	8.0	31.0	56.0	N.	41.0	7.0	36.0	7.0	37.0	11.0
	16		W.	N.	21 46 10.0	44.0	19.0	48.0	24.0	45.0	16.0	S.	3.0	27.0	50.0	15.0	38.0	58.0
22	17	λ Cygni	E.	N.	18 56 10.0	24.8	40.0	54.8	9.9	24.4	39.5	S.	38.4	53.8	8.5	24.0	39.0	55.0
	18		W.	S.	22 24 27.0	41.5	56.5	12.7	27.2	42.8	57.8	N.	56.2	11.9	26.1	41.0	55.8	11.2
	19	Anonymous	E.	S.	19 15 24.0	38.2	52.7	6.8	21.0	35.5	50.0	N.	48.0	3.0	17.5	31.5	47.0	1.0
	20		W.	N.	22 52 17.0	31.0	46.0	0.2	14.1	29.0	44.0	S.	42.5	56.8	11.2	25.0	39.0	53.2
	21	Bessel's Zone, 487 . .	E.	N.	19 25 15.0	48.0	23.7	59.6	35.2	11.0	47.9	S.	16.5	58.0	36.8	17.7	59.9	44.7
	22		W.	S.	20 47 15.5	57.0	40.7	24.0	5.0	45.0	24.2	N.	52.0	30.0	6.5	41.5	18.0	52.0
	23	Bessel's Zone, 313 . .	E.	S.	19 46 16.0	32.5	48.5	7.0	23.0	41.0	59.0	N.	8.0	26.5	43.0	1.0	19.0	37.0
	24		W.	N.	22 46 1.3	19.9	37.5	54.5	13.0	29.8	48.7	S.	59.0	16.0	32.0	48.9	7.4	22.9
23	25	α Cor. Bor.	E.	S.	12 6 5.7	22.0	37.0	45.0	52.5	0.3	8.0	N.	11.0	18.5	26.3	34.0	42.0	57.0
	26		W.	N.	18 48 52.7	9.0	24.0	31.8	39.4	47.5	55.0	S.	58.6	6.0	14.2	21.9	30.0	44.5
	27	Bessel's Zone, 313 . .	E.	S.	19 2 ..	..	..	..	37.5	51.5	6.0	N.	1.0	15.5	29.5	..	..	..
	28		W.	N.	22 47 ..	..	..	..	31.5	45.8	0.2	S.	55.5	10.0	23.8	..	..	..
	29	Anonymous	E.	N.	19 15 27.0	40.5	55.5	9.7	24.0	38.0	53.0	S.	49.0	4.0	18.5	32.5	47.1	2.6
	30		W.	S.	22 52 19.8	33.0	48.9	3.0	18.0	32.0	47.0	N.	43.5	58.0	11.9	26.0	40.9	55.5
	†31	Bessel's Zone, 314 . .	E.	N.	19 50 ..	..	41.2	10.0	41.0	12.5	44.5	S.	50.0	23.6	57.0	34.0	9.0	..
	32		W.	S.	20 40 ..	..	21.0	58.5	33.5	7.0	41.2	N.	45.0	18.0	48.0	19.2	48.8	..
	33	σ Cygni	E.	N.	20 47 ..	..	..	..	..	..	44.0	S.	18.8	..	..	..	..	..
	34		W.	S.	21 32 ..	..	..	..	..	..	16.0	N.	50.0	..	..	..	..	..
	35	Bessel's Zone, 314 . .	E.	S.	21 5 ..	..	..	..	..	..	4.0	N.	44.5	..	..	..	..	..
	36		W.	N.	21 49 ..	..	..	..	..	..	36.0	S.	16.5	..	..	..	..	..
	†37	Lacertæ, (7880) . . .	E.	N.	22 11 ..	..	..	..	..	42.2	17.0	S.	18.0	30.0	..	..	..	..
	38		W.	S.	22 34 ..	..	..	..	..	28.0	34.0	N.	40.0	14.8	..	..	..	..
24	39	α Lyræ‡	E.	S.	17 56 11.3	54.6	39.3	24.9	10.9	58.2	48.7	N.	13.9	11.9	10.5	9.6	14.0	18.0
	40		W.	N.	18 54 49.1	58.4	2.9	7.0	6.5	4.9	2.3	S.	29.0	19.0	7.5	52.3	38.7	22.9
	41	α Bootis	E.	N.	9 55 21.1	33.9	46.8	59.2	5.2	11.6	18.1	S.	20.1	26.5	33.4	39.2	52.0	5.0
	42		W.	S.	18 20 59.2	12.1	25.1	38.0	44.0	50.6	57.2	N.	59.0	5.1	12.0	17.9	30.5	43.2

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Sept. 20	— 0.622	g 0.186
21	1.464	0.112
22	1.464	0.096
23	1.464	0.058
24	— 1.464	g 0.068

	EXTRA WIRES. EAST. 1.	2.	3.	WEST. 1.	2.
	h. m. s.	s. m.	m. s.	h. m. s.	m. s.
* Cygni (6937) over extra wires .	Tel. N. 18 24 58.5	25 30.0	26 2.2	Tel. S. 21 36 30.2	37 4.0
	" S. 18 32 34.0	32 0.5	31 26.0	" N. 21 44 6.8	43 35.5
† λ Cygni, over extra wires . . .	" S. 18 54 39.0	55 7.0	55 37.5	" N. 22 22 53.0	23 21.0
	" N. 19 1 39.8	1 9.5	0 38.0	" S. 22 29 49.5	29 22.4
‡ α Lyræ over extra wires . .	" S. 17 52 7.8	53 24.5	54 48.5	" N. 18 46 5.0	49 25.0
	" N. 18 19 10.9	15 49.2	12 53.2	" S. 19 13 10.2	11 53.7

LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
N.	S.	*Div.*	"	H. M. S.	M. S.	S.	H. M. S.	° ' "	S.	"			
13.10 17.05	14.45 16.95	+ 1.35 − 0.10	+0.47	19 39 33.03	− 0 48.70	+ 1.26	19 37 45.59	36 59 40.39	+ 5.85	+ 2.50	H.	5	Cygni, (6771.)
13.05 18.22	14.30 17.47	+ 1.25 − 0.75	0.19	20 4 32.51	48.74	1.26	20 3 45.01	36 23 54.04	5.89	9.55	H.	5	Cygni, (6937.)
14.35 18.22	14.80 18.32	+ 0.45 + 0.10	+0.21	20 42 15.04	48.82	1.43	20 41 27.65	35 56 12.03	5.98	19.72	H.	5	λ Cygni.
15.65 17.05	15.25 16.95	− 0.40 − 0.10	−0.19	20 11 17.83	48.76	1.54	20 10 30.61	38 26 14.41	5.65	11.14	H.	7.8	Bessel's Zone, 487.
15.88 17.07	15.95 16.50	+ 0.07 − 0.57	−0.19	20 18 10.51	48.77	1.18	20 17 22.92	38 43 40.46	5.62	12.99	H.	8	Bessel's Zone, 314.
15.99 18.17	16.65 17.95	+ 0.66 − 0.22	+0.17	21 7 17.04	48.86	1.30	21 6 29.48	37 56 41.97	5.85	25.87	H.	9	Anonymous.
16.60 17.92	16.15 18.37	− 0.45 + 0.45	0.00	21 18 6.91	48.88	1.64	21 17 19.67	38 2 44.19	5.89	26.40	H.	8	Anonymous.
17.54 17.60	17.35 17.55	− 0.19 0.05	−0.10	21 34 28.66	48.92	1.57	21 33 41.31	38 49 42.02	5.86	33.18	H.	8	Bessel's Zone, 314.
17.30 21.55	17.20 19.95	0.10 − 1.60	−0.63	20 42 18.06	51.61	1.31	20 41 27.76	35 56 11.01	6.00	19.56	H.	5	λ Cygni.
17.55 21.05	17.65 20.98	+ 0.10 − 0.07	+0.01	21 5 46.03	51.65	1.45	21 4 55.83	35 40 53.46	6.09	25.51	H.	9	Anonymous.
17.85 18.95	17.90 19.91	+ 0.05 + 0.96	+0.37	20 11 20.62	51.56	1.44	20 10 30.50	38 26 15.31	5.68	10.99	H.	7.8	Bessel's Zone, 487.
18.15 21.05	17.65 20.98	− 0.50 0.07	−0.22	21 18 28.10	51.67	1.51	21 17 37.94	36 42 7.85	6.05	+28.49	H.	7.8	Bessel's Zone, 313.
19.53 14.75	18.73 16.80	− 0.80 + 2.05	+0.47	15 29 3.13	53.75	1.58	15 28 10.96	27 14 20.60	8.90	−58.34	H.	2	α Cor. Bor.
15.30 18.20	16.80 20.57	1.50 2.37	1.45	20 56 0.60	54.00	1.55	20 55 8.15	35 26 3.14	6.10	+22.93	H.	7	Bessel's Zone, 313.
14.40 18.20	17.90 20.58	3.50 2.38	2.21	21 5 48.01	54.01	1.35	21 4 55.35	35 40 54.92	6.11	25.34	H.	9	Anonymous.
14.98 16.80	18.68 19.30	3.70 2.50	2.33	20.18 15.15	53.97	0.94	20 17 22.12	38 43 41.63	5.67	12.69	H.	8	Bessel's Zone, 314.
16.95 16.80	18.85 20.25	1.90 3.45	2.01	21 12 17.1	54.02	2.23	21 11 25.3	38 45 39.68	5.82	26.59	H.	4	σ Cygni.
17.50 17.70	18.80 19.70	1.30 2.00	1.23	21 29 40.2	54.04	1.81	21 28 48.0	38 45 38.54	5.91	30.76	H.	8	Bessel's Zone, 314.
17.60 18.25	20.30 20.43	2.70 2.18	1.83	22 29 58.00	54.10	0.92	22 29 4.8	38 50 50.97	6.39	43.30	H.	6	Lacertæ, (7880.)
11.69 12.50	14.40 15.45	2.71 2.95	2.13	18 32 38.50	55.17	1.55	18 31 44.88	38 39 4.59	6.07	15.88	H.	1	α Lyræ.
21.55 18.45	23.10 20.45	1.55 + 2.00	+1.33	14 9 38.55	−1 0.28	+1.48	14 8 39.75	19 59 11.17	+ 9.79	−73.42	H.	1	α Bootis.

9. Coarse double; comp. 9th mag.; single revolutions of micrometer.
31. Single revolutions of micrometer.
31 to 38. Stars near the zenith.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES. A.	B.	C.	D.	E.	F.	G.	Telescope.	TIMES OF TRANSIT OVER G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
Sept. 28	1	α Lyræ*	E.	N.	17 56 19.6	59.8	46.9	32.2	19.5	5.3	56.0	S.	20.5	18.7	15.5	15.8	19.9	28.0
	2		W.	S.	18 54 56.0	0.5	9.0	12.2	13.5	10.3	8.5	N.	32.0	23.0	9.9	57.2	42.0	28.3
	3	Anonymous	E.	S.	19 32 19.3	58.5	35.5	15.0	54.5	33.1	15.8	N.	7.0	53.3	40.2	27.3	13.0	3.2
	4		W.	N.	20 44 52.0	42.5	31.0	18.5	7.0	53.3	38.5	S.	31.2	13.5	53.2	33.0	12.0	49.2
	5	Cygni, (7320)	E.	N.	19 58 49.0	13.3	40.9	7.5	35.1	1.8	30.5	S.	20.2	49.5	18.1	47.4	17.8	47.0
	6		W.	S.	21 50 2.7	30.7	2.6	31.7	1.0	28.2	58.3	N.	47.4	17.7	43.6	11.2	38.1	6.8
	†7	Bessel's Zone, 313	E.	S.	20 16 3.0	19.0	34.0	50.6	6.1	21.4	37.7	N.	41.8	58.5	14.7	30.2	46.4	2.0
	8		W.	N.	23 33 9.4	24.5	40.8	57.0	12.9	28.9	45.5	S.	48.5	5.0	21.4	37.0	53.0	8.0
	9	Cygni, (7566)	E.	N.	20 25 36.5	56.8	19.4	42.4	3.9	24.9	47.8	S.	15.3	39.1	2.0	24.5	48.0	12.8
	10		W.	S.	22 44 40.5	1.8	26.8	49.5	14.0	35.0	59.0	N.	26.8	49.9	10.2	33.8	55.7	17.5
29	11	α Bootis	E.	S.	9 55 25.0	37.2	..	3.0	9.2	15.8	22.0	N.	26.4	33.0	39.3	45.3	..	11.1
	12		W.	N.	18 21 3.1	15.5	..	41.1	47.5	54.0	0.2	S.	5.5	12.0	18.0	24.2	..	50.0
	13	Bessel's Zone, 313	E.	N.	19 1 56.3	8.5	23.5	37.0	50.7	4.4	19.0	S.	13.0	27.7	41.0	55.0	9.2	24.1
	14		W.	S.	22 46 49.0	2.3	17.0	31.5	45.0	58.9	13.5	N.	7.4	22.0	35.5	49.1	3.0	18.0
	15	Bessel's Zone, 313	E.	S.	19 13 42.0	58.2	14.3	31.0	47.0	3.6	20.8	N.	26.8	44.0	1.0	18.0	34.8	51.0
	16		W.	N.	22 21 29.2	46.5	3.3	20.5	37.2	54.0	11.0	S.	17.5	34.4	50.7	7.5	24.0	40.5
	17	Cygni, (7462)	E.	S.	19 45 21.0	37.0	53.0	9.5	25.4	41.9	59.0	N.	4.8	21.6	38.2	55.0	12.0	28.9
	18		W.	N.	22 54 40.5	58.0	14.0	30.8	48.0	4.5	21.8	S.	27.3	44.0	0.5	17.0	33.0	48.8
	†19	Bessel's Zone, 314	E.	S.	20 18 25.0	54.2	22.0	51.0	20.5	49.4	20.0	N.	19.8	51.4	22.8	53.2	26.0	57.7
	20		W.	N.	22 2 12.2	46.0	18.0	50.0	21.0	52.2	24.4	S.	22.6	53.8	24.0	53.0	22.0	50.2
	†21	Bessel's Zone, 314	E.	S.	20 18 33.0	1.0	29.5	57.8	27.0	56.2	26.8	N.	25.5	57.0	28.0	59.0	31.2	3.0
	22		W.	N.	22 2 42.0	15.8	47.0	19.0	50.0	22.0	53.1	S.	51.5	22.0	51.5	20.0	49.0	18.0
	†23	Anonymous	E.	N.	20 34 21.5	44.5	8.3	32.5	56.8	..	..	S.	..	..	28.0	54.5	20.0	48.0
	24		W.	S.	21 38 45.0	10.0	37.5	4.0	32.0	..	..	N.	..	..	1.7	26.0	50.0	14.0
	25	α Lacertæ	E.	S.	20 44 6.0	24.2	42.5	1.0	19.2	38.0	56.6	N.	11.4	30.8	49.8	8.6	27.8	46.8
	26		W.	N.	23 31 43.2	3.0	21.8	41.0	0.0	18.9	38.2	S.	52.0	10.9	29.7	47.5	6.8	24.0
Oct. 1	27	α Bootis	E.	S.	9 55 31.4	43.9	56.5	9.4	15.3	21.6	28.1	N.	32.8	39.1	45.3	52.0	4.2	17.4
	28		W.	N.	18 21 9.5	21.9	35.0	47.2	53.5	0.0	6.5	S.	11.2	17.5	24.0	30.2	42.8	55.8
	29	Cygni, (6967)	E.	S.	18 31 ..	18.5	34.4	50.4	6.2	22.3	..	N.	..	59.9	16.0	32.0	48.8	5.0
	30		W.	N.	21 44 ..	54.3	10.0	27.0	43.0	59.0	..	S.	..	36.4	52.0	8.8	24.5	40.8
	†31	Bessel's Zone, 314	E.	N.	19 50 2.0	30.0	1.3	..	..	33.2	3.5	S.	8.5	40.4	..	..	27.0	6.0
	32		W.	S.	20 39 23.0	0.5	38.0	..	..	24.5	0.0	N.	5.0	35.0	..	..	6.5	35.0
	†33	61^1 Cygni	E.	S.	20 1 ..	..	..	..	52.5	19.0	47.0	N.	35.4	3.8	32.0	..	..	..
	34		W.	N.	21 56 ..	..	..	..	55.0	23.6	52.0	S.	41.0	8.5	35.0	..	..	..
	†35	61^2 Cygni	E.	S.	20 1 ..	..	..	..	52.5	19.0	47.0	N.	35.4	3.8	32.0	..	..	..
	36		W.	N.	21 56 ..	..	..	..	58.0	27.0	55.0	S.	44.2	11.5	38.0	..	..	..
5	37	Bessel's Zone, 313	E.	N.	19 23 44.3	58.8	14.1	29.8	44.1	59.0	14.8	S.	13.7	30.0	45.0	0.0	15.5	31.8
	38		W.	S.	22 49 27.5	42.0	58.2	14.0	29.5	44.2	0.0	N.	59.2	15.0	30.0	45.0	0.0	15.2
	39	Anonymous	E.	S.	19 35 31.5	51.0	10.0	32.2	53.8	15.5	..	N.	..	43.5	8.0	31.0	55.0	19.0
	40		W.	N.	20 48 43.5	7.5	31.0	53.0	18.0	41.0	..	S.	..	10.0	30.0	51.0	13.0	34.5
	41	Bessel's Zone, 313	E.	N.	19 55 54.5	8.1	24.2	38.3	53.4	7.9	23.0	S.	20.0	35.7	50.7	5.8	21.0	36.4
	42		W.	S.	23 26 11.6	26.0	42.0	57.0	12.0	26.7	41.9	N.	40.0	55.3	9.9	24.5	39.5	54.6

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Sept. 28	— 1.464	g 0.190
29	1.464	.129
Oct. 1	1.464	.078
5	— 1.464	g 0.142

	EXTRA WIRES. EAST. 1.	2.	3.	WEST. 1.	2.
	h. m. s.	m. s.	m. s.	h. m. s.	m. s.
* α Lyræ over extra wires	Tel. N. 17 52 13.0	53 32.2	54 55.7	Tel. S. 18 46 6.0	49 32.0
	" S. 18 19 22.2	15 56.	13 1.5	" N. 19 13 16.0	11 57.5

No.	LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
	Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
	N.	S.	Dir.	"	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	S.	"			
1 2	18.55 19.93	19.47 20.97	+ 0.92 1.04	+0.73	18 32 44.32	—1 1.13	+1.47	18 31 44.66	38 39 5.59	+ 6.17	—15.99	H.	1	α Lyræ.
3 4	20.96 21.56	22.47 23.54	1.51 2.18	1.38	20 14 23.31	1 1.47	1.69	20 13 23.43	38 32 2.31	5.80	+10.97	H.	8	Anonymous.
5 6	21.50 23.20	22.05 23.90	0.55 0.70	0.47	20 58 9.51	1 1.61	1.50	20 57 9.40	38 3 37.87	5.93	22.34	H.	6.7	Cygni, (7320.)
7 8	21.65 24.55	22.38 26.35	0.73 1.80	0.95	21 56 43.57	1 1.78	1.59	21 55 43.38	36 15 6.48	6.39	35.89	H.	8	Bessel's Zone, 313.
9 10	20.68 24.07	23.48 25.10	2.80 1.03	1.43	21 38 7.47	1 1.73	1.18	21 37 6.92	37 35 24.84	6.15	+31.80	H.	6	Cygni, (7566.)
11 12	27.81 18.26	28.00 22.10	0.19 3.84	1.51	14 9 43.50	1 5.37	1.55	14 8 39.68	19 59 11.75	9.80	—73.28	H.	1	α Bootis.
13 14	19.15 21.10	22.00 24.25	2.85 3.15	2.25	20 56 13.16	1 6.26	1.49	20 55 8.41	35 26 3.29	6.21	+22.03	H.	7	Bessel's Zone, 313.
15 16	19.00 21.49	22.20 23.59	3.20 2.10	1.99	20 49 49.07	1 6.03	1.34	20 48 44.38	36 29 58.06	6.09	20.30	H.	9	Bessel's Zone, 313.
17 18	19.84 22.45	21.91 23.50	2.07 1.05	1.17	21 22 13.10	1 6.32	1.35	21 21 8.13	36 27 33.21	6.14	28.12	H.	6	Cygni, (7462.)
19 20	20.05 21.67	22.45 23.07	2.40 1.40	1.42	21 14 21.85	1 6.30	1.24	21 13 16.79	38 10 5.72	5.99	26.10	H.	8	Bessel's Zone, 314.
21 22	20.05 21.67	22.45 23.07	2.40 1.40	1.42	21 14 39.16	1 6.30	1.24	21 13 34.10	38 9 47.17	6.05	26.15	H.	10	Bessel's Zone, 314.
23 24	20.03 21.00	22.85 23.20	2.82 2.20	1.89	21 9 29.54	1 6.29	1.25	21 8 24.50	38 36 56.62	5.93	24.89	H.	9	Anonymous.
25 26	20.85 21.85	22.80 24.45	1.95 2.60	1.71	22 10 24.58	1 6.42	1.55	22 9 19.71	36 59 34.40	6.43	+38.38	H.	4.5	α Lacertæ.
27 28	23.42 14.10	24.50 17.81	1.08 3.71	1.80	14 9 49.65	1 12.11	1.53	14 8 39.07	19 59 11.62	9.81	—73.00	H.	1	α Bootis.
29 30	14.87 17.50	17.02 20.22	2.15 2.72	1.83	20 9 59.53	1 12.60	1.53	20 8 48.46	36 20 48.98	6.12	+ 9.78	H.	6	Cygni, (6967.)
31 32	15.00 16.55	19.10 19.36	4.10 2.81	2.59	20 18 33.54	1 12.61	0.88	20 17 21.81	38 43 42.46	5.84	11.78	H.	8	Bessel's Zone, 314.
33 34	15.13 17.75	19.15 20.38	4.02 2.63	2.50	21 1 13.74	1 12.66	1.09	21 0 2.17	38 0 20.57	7.10	33.24	H.	5.6	61¹ Cygni.
35 36	15.13 17.75	19.15 20.38	4.02 2.63	+2.50	21 1 15.28	1 12.66	1.09	21 0 3.71	38 0 17.66	7.11	32.48	H.	6	61² Cygni.
37 38	20.60 24.47	20.80 23.57	+ 0.20 — 0.90	—0.26	21 8 37.04	1 19.81	1.35	21 7 18.58	36 0 35.91	6.29	24.09	H.	7.8	Bessel's Zone, 313.
39 40	20.40 22.65	21.80 21.95	+ 1.40 — 0.70	+0.26	20 14 42.53	1 19.64	0.89	20 13 23.78	38 32 2.75	5.96	10.30	H.	8	Anonymous.
41 42	20.65 24.90	21.40 24.10	+ 0.75 — 0.80	—0.02	21 43 1.39	—1 19.93	+1.31	21 41 42.77	35 52 39.76	+ 6.44	+31.82	H.	7.8	Bessel's Zone, 313.

7. Star of 9th magnitude preceding.
19 & 21. Observed at same time.
23 & 27. Single revolutions of micrometer.
31. Single revolutions of micrometer.
33 & 35. Interrupted by clouds.
39. Single revolutions of micrometer.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES. A.	B.	C.	D.	E.	F.	G.	Telescope.	TIMES OF TRANSIT OVER G.	F.	E.	D.	C.	B.
					H. M. S.	s.	s.	s.	s.	s.	s.		s.	s.	s.	s.	s.	s.
Oct. 5	1	61¹ Cygni	E.	S.	20 0 ..	43.6	8.7	36.2	2.0	27.8	55.8	N.	44.0	13.0	42.0	8.3	38.0	6.2
	2		W.	N.	21 55 ..	37.5	5.0	34.2	2.0	30.5	59.0	S.	47.5	15.0	41.5	7.5	34.2	0.5
	3	61² Cygni	E.	S.	20 0 ..	43.6	8.7	36.2	2.0	27.8	55.8	N.	44.0	13.0	42.0	8.3	38.0	6.2
	4		W.	N.	21 55 ..	40.0	8.0	38.0	5.0	34.0	2.0	S.	51.0	18.3	45.0	10.5	37.0	3.0
	5	Bessel's Zone, 313 . .	E.	N.	20 16 24.3	38.5	55.2	11.1	27.2	42.2	58.8	S.	0.5	16.5	32.8	48.5	4.5	21.8
	6		W.	S.	23 33 28.6	42.3	59.5	15.2	32.0	47.2	3.8	N.	6.0	22.0	37.5	53.4	9.0	25.2
	7	Anonymous	E.	S.	20 34 14.5	37.5	1.0	25.0	48.8	11.0	36.0	N.	20.0	45.0	12.0	39.0	7.0	35.0
	8		W.	N.	21 38 25.0	52.5	20.0	47.0	16.0	42.0	8.0	S.	50.0	14.0	38.5	1.5	27.0	49.0
	9	Anonymous	E.	S.	21 4 ..	3.0	20.0	38.0	55.0	12.6	..	N.	..	0.0	19.0	36.5	54.6	13.0
	10		W.	N.	23 59 ..	46.8	4.4	23.1	40.8	59.0	..	S.	..	47.0	4.4	21.5	39.2	56.5
	†11	Lacertæ, (7880) . . .	E.	S.	22 12 51.0	14.5	37.5	4.0	28.0	54.0	15.0	N.	34.0	12.0	54.0	38.0	25.0	21.0
	12		W.	N.	22 36 27.0	29.0	25.0	10.0	53.0	32.0	12.0	S.	25.0	51.0	18.0	45.0	10.0	33.0
6	13	Bessel's Zone, 313 . .	E.	S.	19 9 52.2	5.3	18.3	31.9	45.0	58.3	12.0	N.	6.0	19.9	33.2	46.9	0.5	13.7
	14		W.	N.	23 2 44.8	58.8	11.9	25.5	39.0	52.3	6.5	S.	0.0	14.0	27.0	40.5	53.8	7.0
	15	Anonymous	E.	N.	19 17 ..	..	..	..	..	9.9	24.6	S.	20.7	35.6	..	..	..	..
	16		W.	S.	22 54 ..	..	..	..	..	2.5	18.0	N.	13.0	28.1	..	..	..	..
	17	Bessel's Zone, 313 . .	E.	S.	19 23 47.6	3.0	17.9	33.0	48.0	2.7	18.4	N.	19.0	35.2	50.6	5.6	21.2	36.4
	18		W.	N.	22 49 31.5	47.0	2.0	17.9	33.0	48.2	4.1	S.	5.0	20.5	35.6	50.5	5.7	20.6
	19	Anonymous	E.	N.	19 42 ..	23.2	37.0	50.5	3.7	16.5	30.8	S.	22.7	36.5	49.8	3.0	16.8	31.0
	20		W.	S.	23 35 ..	49.2	3.2	16.7	30.2	43.0	57.5	N.	49.5	3.0	16.0	29.5	42.2	56.5
	†21	Bessel's Zone, 314 . .	E.	S.	19 50 17.0	45.5	16.0	44.0	15.2	46.2	18.5	N.	23.5	57.5	31.0	8.0	43.2	22.2
	22		W.	N.	20 39 31.2	10.3	48.2	23.8	58.8	34.0	8.0	S.	15.3	44.5	14.8	46.6	18.0	47.0
	†23	Anonymous	E.	N.	20 5 ..	26.0	52.3	18.3	43.6	8.5	35.5	S.	19.0	46.5	12.0	39.5	6.8	36.8
	24		W.	S.	22 4 ..	8.0	37.6	6.0	32.6	58.8	27.0	N.	9.0	35.8	1.5	26.9	52.5	19.0
	25	Anonymous	E.	S.	20 23 21.0	53.5	25.5	0.0	33.5	8.0	..	N.	..	41.5	26.0	6.0	49.0	37.0
	26		W.	N.	21 5 29.0	15.0	4.0	48.0	30.0	12.0	..	S.	..	44.5	18.0	54.0	27.0	0.0
	†27	Lacertæ, (7901) . . .	E.	S.	21 41 2.0	30.0	0.5	31.1	1.0	32.8	4.5	N.	13.0	47.7	21.0	55.0	29.0	3.0
	28		W.	N.	23 17 59.0	32.5	8.0	42.5	16.0	49.8	23.5	S.	33.0	6.0	36.9	7.0	37.9	8.0
	29	Lacertæ, (7880) . . .	E.	N.	22 14 33.0	26.5	20.0	..	..	..	..	S.	..	..	..	..	25.0	36.0
	30		W.	S.	22 39 59.5	20.0	31.0	..	..	..	..	N.	..	..	..	..	36.0	30.5
7†	31	Cygni, (6849)	E.	N.	18 53 26.0	51.5	20.0	47.5	15.0	42.4	11.5	S.	3.7	34.0	2.7	32.6	2.8	35.0
	32		W.	S.	20 42 42.1	11.0	43.8	13.8	43.0	12.8	41.8	N.	34.4	3.1	30.5	58.5	25.9	54.4
	33	Bessel's Zone, 313 . .	E.	S.	19 9 57.9	11.0	24.0	37.8	50.9	4.5	18.0	N.	12.0	25.8	39.5	52.9	6.5	20.0
	34		W.	N.	23 2 51.0	4.6	18.0	31.7	45.3	58.9	12.3	S.	6.0	20.0	33.0	46.5	0.0	13.0
	35	Bessel's Zone, 312 . .	E.	N.	19 21 17.9	28.5	40.6	52.5	4.2	15.5	..	S.	..	25.0	36.5	48.3	0.1	12.0
	36		W.	S.	23 47 46.5	57.8	9.8	22.0	33.8	45.2	..	N.	..	54.9	6.1	18.0	29.8	41.9
	37	Bessel's Zone, 312 . .	E.	S.	19 39 14.2	25.3	37.0	49.0	0.1	11.9	23.9	N.	10.5	22.7	34.3	46.0	57.9	9.1
	38		W.	N.	0 7 56.5	8.0	20.0	31.7	43.1	55.0	7.0	S.	53.0	4.9	16.5	28.1	40.0	51.1
	39	Bessel's Zone, 313 . .	E.	S.	19 55 58.0	11.3	25.0	39.0	52.3	6.5	21.0	N.	16.1	30.8	44.5	58.2	12.8	27.0
	40		W.	N.	23 40 59.5	13.0	27.2	41.3	55.2	9.0	23.8	S.	19.0	33.3	47.1	1.0	14.6	28.2
	41	Anonymous	E.	N.	20 3 ..	..	13.1	35.1	57.5	19.0	42.2	S.	10.0	34.4	56.3	19.5	43.0	..
	42		W.	S.	22 21 ..	..	50.0	13.1	36.7	59.6	22.9	N.	50.5	13.5	35.2	57.4	20.0	..

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Oct. 5	— 1.464	g 0.142
6	— 1.464	.190
7	+ 0.192	g 0.148

11. Half revolutions of micrometer.
21. Single revolutions of micrometer.
24. Single revolutions of micrometer.

	LEVEL READINGS. Means.		LEVEL READINGS. Diff.	Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR Clock.	CORRECTION FOR Azimuth and Chg. of Lev.	OBSERVED R. Ascension.	OBSERVED N. Declination	REDUCTION TO 1850.0 R. A.	REDUCTION TO 1850.0 Decl.	Observer.	Magnitude.	OBJECTS.
	N.	S.	Div.	"	H. M. S.	M. S.	S.	H. M. S.	° ' "	S.	"			
1 2	21.93 24.00	21.80 22.58	− 0.13 1.42	−0.58	21 1 21.68	−1 19.79	+1.21	21 0 3.10	38 0 19.78	+ 7.18	+32.66	H.	5.6	61¹ Cygni.
3 4	21.93 24.00	21.80 22.58	0.13 1.42	0.58	21 1 23.20	1 19.79	1.21	21 0 4.62	38 0 16.94	7.22	31.91	H.	6	61² Cygni.
5 6	21.93 25.42	21.80 23.82	0.13 1.60	0.64	21 57 2.11	1 19.99	1.30	21 55 43.42	36 15 8.16	6.49	34.67	H.	8	Bessel's Zone, 313.
7 8	22.30 23.55	21.70 22.15	0.60 − 1.40	−0.75	21 9 43.37	1 19.81	1.18	21 8 24.74	38 36 57.13	6.04	24.00	H.	9	Anonymous.
9 0	22.00 25.15	22.40 24.95	+ 0.40 − 0.20	+0.08	22 33 59.67	1 20.09	1.39	22 32 40.97	36 48 5.33	6.69	39.49	H.	7.8	Anonymous.
1 2	24.13 24.75	23.13 23.30	− 1.00 − 1.45	−0.92	22 30 23.43	1 20.09	1.12	22 29 4.46	38 50 52.92	6.51	40.77	H.	6	Lacertæ, (7880.)
3 4	19.00 22.55	20.30 22.48	+ 1.30 − 0.07	+0.46	21 8 6.17	1 24.83	1.34	21 6 42.68	35 10 37.11	6.39	23.96	H.	8	Bessel's Zone, 313.
5 6	19.00 22.55	20.70 22.48	+ 1.70 − 0.07	0.61	21 6 18.95	1 24.83	1.29	21 4 55.41	35 40 56.85	6.34	23.46	H.	9	Anonymous.
7 8	19.05 22.98	20.90 21.98	+ 1.85 − 1.00	+0.32	21 8 41.70	1 24.83	1.16	21 7 18.03	36 0 36.21	6.31	23.96	H.	7.8	Bessel's Zone, 313.
9 0	20.04 23.21	20.12 22.42	+ 0.08 − 0.79	−0.26	21 40 39.88	1 24.92	1.39	21 39 16.35	35 9 32.35	6.50	31.25	H.	8	Anonymous.
1 2	19.55 21.05	20.99 20.68	+ 1.44 − 0.37	+0.39	20 18 45.88	1 24.69	0.61	20 17 21.80	38 43 42.42	5.96	11.20	H.	8	Bessel's Zone, 314.
3 4	19.90 22.40	21.00 21.50	+ 1.10 − 0.90	0.08	21 7 52.38	1 24.83	1.10	21 6 28.65	37 56 44.05	6.12	23.50	H.	9	Anonymous.
5 6	19.95 21.63	21.44 20.71	+ 1.49 − 0.92	0.21	20 48 56.64	1 24.78	0.21	20 47 32.08	38 46 12.95	5.99	18.82	H.	10	Anonymous.
7 8	21.80 22.05	21.50 23.05	− 0.30 + 1.00	0.26	22 33 48.79	1 25.07	1.88	22 32 25.60	38 15 34.24	6.59	41.21	H.	6	Lacertæ, (7901.)
9 0	22.03 22.05	22.20 22.55	0.17 0.50	0.25	22 30 28.08	1 25.07	+1.72	22 29 4.73	38 50 53.97	6.52	40.59	H.	6	Lacertæ, (7880.)
1 2	17.85 18.80	17.95 19.42	0.10 0.62	0.27	19 51 52.99	1 28.97	−0.09	19 50 23.93	38 5 22.85	6.08	4.17	H.	5	Cygni, (6849.)
3 4	17.97 19.85	18.05 21.40	0.08 1.55	0.61	21 8 12.17	1 29.11	0.06	21 6 43.00	35 10 36.76	6.41	23.81	H.	8	Bessel's Zone, 313.
5 6	18.00 21.02	18.13 20.98	+ 0.13 − 0.04	0.04	21 36 5.11	1 29.17	0.20	21 34 35.74	33 59 14.04	6.61	30.24	H.	8	Bessel's Zone, 312.
7 8	18.10 21.00	18.30 21.05	+ 0.20 0.05	0.10	21 55 8.59	1 29.23	0.20	21 53 39.16	33 54 8.94	6.69	34.21	H.	8	Bessel's Zone, 312.
9 0	18.16 21.01	18.85 20.88	+ 0.69 − 0.13	0.22	21 50 19.91	1 29.21	0.27	21 48 50.43	35 25 46.31	6.54	33.06	H.	8	Bessel's Zone, 313.
	18.35 20.31	18.95 20.15	+ 0.60 − 0.16	+0.17	21 14 46.47	−1 29.13	−0.31	21 13 17.03	37 35 58.11	+ 6.20	+25.00	H.	6.7	Anonymous.

Oct. 7. Adjusted in Azimuth.

27. Single revolutions of micrometer.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVER					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
Oct. 19	1	Bessel's Zone, 379 . .	E.	N.	20 59 56.5	12.0	29.8	46.5	..	..	..	S.	..	..	..	34.5	52.0	9.5
	2		W.	S.	0 4 22.5	38.0	56.5	13.5	..	..	..	N.	..	..	..	1.5	18.5	36.0
	3	Bessel's Zone, 379 . .	E.	S.	21 9 47.0	2.0	17.8	34.0	49.5	5.7	21.6	N.	26.0	42.8	58.6	15.0	31.0	47.0
	4		W.	N.	0 26 18.0	34.2	50.6	6.4	22.0	38.7	54.4	S.	59.0	16.0	32.0	46.6	3.5	18.6
	†5	Bessel's Zone, 379 . .	E.	N.	21 20 24.0	38.0	54.0	8.5	24.0	39.0	..	S.	..	9.0	24.0	39.5	55.0	11.0
	6		W.	S.	0 45 38.0	53.0	8.0	24.0	39.0	54.0	..	N.	..	25.0	40.0	54.5	10.0	25.5
	†7	Bessel's Zone, 379 . .	E.	N.	21 20 35.0	50.0	4.5	20.0	35.0	49.9	..	S.	..	21.0	35.5	51.0	7.0	23.0
	8		W.	S.	0 45 19.7	35.0	50.0	5.5	21.0	36.0	..	N.	..	7.7	22.0	37.0	51.5	7.0
	9	Anonymous	E.	N.	22 37 49.5	6.4	24.5	41.9	0.0	17.4	36.0	S.	45.5	4.4	22.0	40.4	58.8	18.1
	10		W.	S.	1 31 42.5	59.8	19.0	37.0	55.8	14.3	32.2	N.	41.6	0.2	17.5	35.5	53.0	11.5
	11	Bessel's Zone, 387 . .	E.	S.	22 53 34.0	57.2	20.0	44.0	7.3	31.2	55.8	N.	33.3	59.0	23.5	48.4	13.5	39.0
	12		W.	N.	1 2 18.2	43.0	9.0	34.5	58.5	23.0	49.0	S.	27.5	52.0	15.5	39.5	2.5	25.7
	13	ϑ Andromedæ	E.	N.	23 6 ..	..	..	..	57.0	20.6	47.0	S.	24.0	50.0	15.5	..	..	..
	14		W.	S.	1 12 ..	..	..	..	28.6	53.0	20.0	N.	55.6	20.8	45.0	..	..	..
	15	Bessel's Zone, 387 . .	E.	S.	23 25 36.0	2.0	27.2	55.0	21.0	47.0	15.0	N.	5.4	32.0	0.4	29.0	58.5	26.9
	16		W.	N.	1 20 41.5	10.0	37.2	6.6	35.0	3.8	32.5	S.	21.0	48.5	15.0	40.6	7.1	34.0
21	17	Anonymous	E.	N.	20 46 6.8	21.5	36.2	51.5	6.4	..	..	S.	..	..	5.8	21.0	36.0	52.5
	18		W.	S.	0 12 59.2	13.0	30.0	45.0	0.0	..	..	N.	..	..	59.5	14.5	29.5	45.5
	†19	Anonymous	E.	S.	20 54 37.0	5.0	35.0	5.0	35.0	7.0	..	N.	..	19.0	52.0	25.5	59.0	33.5
	20		W.	N.	22 32 49.7	25.0	57.5	32.5	5.7	39.5	..	S.	..	51.8	21.5	54.0	22.5	53.0
	†21	Anonymous	E.	S.	20 53 43.2	11.5	41.0	10.0	40.5	10.5	40.5	N.	45.5	18.5	50.5	23.0	56.0	28.5
	22		W.	N.	22 34 23.0	55.0	29.5	3.5	34.5	7.0	40.0	S.	45.0	15.0	46.0	14.5	45.0	14.0
	23	Bessel's Zone, 379 . .	E.	N.	21 6 54.5	12.0	31.1	50.5	9.5	27.0	47.0	S.	0.0	20.0	39.0	58.0	17.9	38.0
	24		W.	S.	23 51 44.0	1.5	22.0	42.0	1.5	20.5	40.0	N.	53.0	13.0	31.0	50.0	8.5	28.0
	25	Bessel's Zone, 379 . .	E.	N.	21 26 49.0	2.4	17.0	30.5	44.2	58.0	12.8	S.	7.2	22.2	35.5	50.0	5.0	19.5
	26		W.	S.	1 8 44.2	57.6	12.2	26.5	40.8	54.6	9.9	N.	3.7	18.5	32.0	46.5	0.8	15.0
	27	Bessel's Zone, 379 . .	E.	S.	21 48 13.4	28.3	41.9	57.0	11.9	26.4	41.1	N.	42.0	56.7	11.8	26.4	42.0	56.6
	28		W.	N.	1 18 33.5	50.0	4.0	20.0	34.0	48.7	4.7	S.	3.6	19.4	34.5	48.5	3.0	18.5
	29	Anonymous	E.	S.	23 2 25.0	59.5	33.0	9.0	45.2	21.0	58.5	N.	29.0	9.0	49.5	30.0	11.8	53.0
	30		W.	N.	0 24 44.8	27.0	9.2	51.5	31.6	11.9	51.6	S.	22.3	1.5	36.0	11.0	47.6	21.5
24	31	Bessel's Zone, 379 . .	E.	S.	21 11 ..	..	..	..	..	9.5	27.7	N.	35.2	53.2	..	..	..	..
	32		W.	N.	0 14 ..	..	..	..	..	21.0	39.0	S.	46.2	4.0	..	..	..	..
	33	Bessel's Zone, 379 . .	E.	N.	21 26 52.5	5.2	20.3	34.6	49.0	2.5	17.5	S.	13.5	28.0	42.0	56.7	11.2	26.5
	34		W.	S.	1 8 49.5	2.6	18.0	32.0	46.3	0.5	15.0	N.	10.0	24.6	38.0	52.0	6.0	20.8
	35	Bessel's Zone, 384 . .	E.	S.	21 31 5.5	18.2	31.0	44.5	57.2	9.9	23.5	N.	16.5	29.9	43.1	56.3	9.2	22.2
	36		W.	N.	1 30 4.5	18.0	31.0	44.5	57.5	10.9	24.5	S.	16.5	29.7	43.0	55.9	8.8	21.5
	37	Bessel's Zone, 379 . .	E.	N.	21 48 21.0	34.5	49.9	4.2	19.2	33.7	49.0	S.	47.0	2.2	17.0	32.0	47.0	3.0
	38		W.	S.	1 18 40.9	55.0	10.8	26.0	41.4	56.0	11.1	N.	9.0	24.0	38.6	53.5	8.0	24.0
	39	Andromedæ, (8136) . .	E.	S.	21 57 38.0	58.2	18.5	38.8	59.0	19.5	40.5	N.	3.0	24.5	45.8	6.0	28.0	49.0
	40		W.	N.	0 28 43.5	4.2	25.7	47.0	8.0	30.0	51.0	S.	14.0	34.9	55.8	16.0	36.0	56.0
	41	Andromedæ, (8195) . .	E.	N.	22 38 40.0	11.5	46.9	20.6	55.4	29.7	6.0	S.	28.5	7.6	45.0	24.7	5.8	46.5
	42		W.	S.	0 3 59.1	37.6	20.8	0.2	40.0	16.5	56.0	N.	19.6	56.4	30.8	5.0	40.0	14.8

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Oct. 19	+ 0.192	g 0.160
21	− 0.155	0.102
24	− 0.155	g 0.102

5 & 7. Observed at same time.

LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
N.	S.	*Div.*	"	H. M. S.	M. S.	S.	H. M. S.	° ' "	S.	"			
30.91 33.87	30.34 31.83	— 0.57 2.04	—0.98	22 34 24.05	—2 12.57	—0.37	22 32 11.11	36 35 7.17	+ 6.88	+39.21	H.	8	Bessel's Zone, 379.
31.15 34.36	30.17 32.25	0.98 2.11	1.16	22 50 10.53	2 12.60	0.32	22 47 57.61	36 16 0.59	7.00	41.71	H.	7	Bessel's Zone, 379.
31.35 34.52	30.50 32.46	0.85 2.06	1.09	23 5 1.82	2 12.65	0.31	23 2 48.86	36 1 25.96	7.13	43.85	H.	8.9	Bessel's Zone, 379.
31.35 34.52	30.50 32.46	0.85 2.06	1.09	23 4 58.46	2 12.65	0.31	23 2 45.50	36 2 15.96	7.13	43.84	H.	9	Bessel's Zone, 379.
32.15 34.89	31.50 33.00	0.65 1.89	0.96	0 7 8.87	2 12.81	0.35	0 4 55.71	36 50 43.73	7.64	50.27	H.	8	Anonymous.
32.55 34.50	31.50 33.00	1.05 1.50	0.96	0 1 11.38	2 12.79	0.27	23 58 58.32	37 46 36 87	7.55	48.34	H.	9	Bessel's Zone, 387.
32.60 34.61	31.59 33.00	1.01 1.61	0.99	0 11 21.62	2 12.82	0.30	0 9 8.50	37 50 4.17	7.66	54.50	H.	5	ϑ Andromedæ.
33.10 34.80	31.65 33.00	1.45 1.80	1.21	0 26 47.94	2 12.85	—0.26	0 24 34.83	38 0 6.37	7.82	51.47	H.	7.8	Bessel's Zone, 387.
31.55 35.04	31.00 33.60	0.55 1.44	0.75	22 31 33.02	2 18.23	+0.06	22 29 14.85	35 58 36.28	6.86	37.19	H.	8	Anonymous.
32.00 33.28	30.98 32.38	1.02 0.90	0.72	21 47 59.05	2 18.16	0.13	21 45 41.02	38 14 34.01	6.59	30.27	H.	9	Anonymous.
32.00 33.28	30.98 32.38	1.02 0.90	0.72	21 48 12.68	2 18.16	0.13	21 45 54.65	38 12 37.43	6.54	30.31	H.	9.10	Anonymous.
32.00 34.60	31.15 33.50	0.85 1.10	0.73	22 31 50.09	2 18.23	0.12	22 29 31.98	37 3 21.47	6.86	38.44	H.	7	Bessel's Zone, 379.
32.15 35.41	31.50 34.27	0.65 1.14	0.67	23 19 38.44	2 18.31	0.10	23 17 20.23	35 31 34.95	7.29	45.45	H.	8.9	Bessel's Zone, 379.
32.15 35.30	31.55 34.35	0.60 0.95	0.58	23 35 22.97	2 18.34	0.12	23 33 4.75	35 52 32.63	7.40	47.19	H.	7	Bessel's Zone, 379.
34.00 35.00	32.45 34.05	1.55 0.95	0.94	23 48 40.46	2 18.36	0.32	23 46 22.42	38 26 1.74	7.45	48.29	H.	7.8	Anonymous.
30.40 33.15	28.55 30.65	1.85 2.50	1.63	22 43 36.98	2 24.63	0.08	22 41 12.43	36 37 3.48	7.01	39.96	H.	6.7	Bessel's Zone, 379.
30.33 33.77	28.60 31.10	1.73 2.67	1.65	23 19 43.91	2 24.69	0.07	23 17 19.29	35 31 33.28	6.63	47.96	H.	8.9	Bessel's Zone, 379.
30.45 34.05	28.65 31.75	1.80 2.30	1.54	23 32 20.12	2 24.71	0.11	23 29 55.52	34 58 23.57	7.44	46.48	H.	9	Bessel's Zone, 384.
30.63 34.16	29.00 31.40	1.63 2.76	1.65	23 35 29.00	2 24.72	0.04	23 33 4.32	35 52 32.91	7.42	46.70	H.	7	Bessel's Zone, 379.
30.85 33.15	29.19 30.65	1.66 2.50	1.56	23 15 57.07	2 24.69	+0.03	23 13 32.41	37 21 7.35	7.20	44.33	H.	6	Andromedæ, (8136.)
31.85 33.10	29.80 30.45	2.05 — 2.65	—1.76	23 26 12.71	—2 24.70	0.00	23 23 48.01	38 24 0.87	+ 7.23	+45.42	H.	6	Andromedæ, (8195.)

19 & 21. Observed at same time.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES. A.	B.	C.	D.	E.	F.	G.	Telescope.	TIMES OF TRANSIT OVER G.	F.	E.	D.	C.	B.
					H. M. S.	s.	s.	s.	s.	s.	s.		s.	s.	s.	s.	s.	s.
Oct. 24	1	ρ Andromedæ	E.	S.	22 52 ..	..	..	59.3	18.1	37.0	57.2	N.	14.5	34.4	54.0	13.9	..	..
	2		W.	N.	1 34 ..	..	..	49.5	8.5	28.2	48.5	S.	5.5	25.0	44.4	3.0	..	..
26†	3	Anonymous	E.	S.	20 30 14.0	55.8	37.2	21.0	4.5	49.5	36.8	N.	50.3	43.8	38.0	32.0	31.0	29.4
	4		W.	N.	21 33 18.0	18.8	16.8	15.4	9.0	3.5	56.6	S.	11.2	58.5	43.0	26.2	10.6	52.5
	5	Bessel's Zone, 314	E.	N.	20 49 6.5	32.5	1.4	29.8	57.4	25.5	54.0	S.	49.8	21.0	50.5	21.0	52.0	24.5
	6		W.	S.	22 36 1.0	30.5	3.0	34.0	4.0	34.0	4.0	N.	59.4	29.5	56.9	25.0	53.0	21.7
	7	Bessel's Zone, 379	E.	S.	21 7 21.0	37.0	54.1	11.0	27.8	44.5	2.1	N.	10.4	28.0	45.0	2.3	20.0	37.0
	8		W.	N.	0 10 31.2	48.0	6.6	24.0	41.0	58.4	15.5	S.	22.0	39.5	56.0	13.0	30.0	47.4
	9	ρ Andromedæ	E.	N.	22 49 40.0	58.0	17.5	36.7	55.9	14.9	34.2	S.	50.1	9.9	29.0	48.9	9.0	29.0
	10		W.	S.	1 31 25.8	45.0	6.0	25.9	45.4	4.6	24.5	N.	40.5	0.2	19.0	38.0	57.0	16.8
	11	Anonymous	E.	S.	23 0 ..	43.2	17.2	53.2	28.2	3.7	41.6	N.	12.0	52.8	33.0	13.4	55.8	37.9
	12		W.	N.	0 23 ..	7.5	49.2	31.7	11.2	52.1	32.2	S.	4.3	41.8	18.4	53.2	28.9	3.0
	13	μ Andromedæ	E.	N.	23 37 53.2	14.7	38.0	0.5	23.0	45.8	..	S.	..	4.4	27.0	51.2	15.0	40.5
	14		W.	S.	1 52 34.7	57.7	23.0	47.5	11.0	34.0	..	N.	..	53.0	15.5	38.3	0.9	24.2
Nov. 3	†15	σ Cygni	E.	S.	20 46 ..	..	..	51.0	25.0	59.2	34.7	N.	47.0	25.0	5.0	46.5	..	..
	16		W.	N.	21 30 ..	..	..	55.5	36.0	17.0	55.6	S.	6.0	42.0	16.0	50.0	..	..
20	17	Andromedæ, (544)	E.	N.	0 18 11.8	29.6	49.5	8.9	28.4	48.0	7.2	S.	23.3	43.8	3.5	23.4	43.6	5.0
	18		W.	S.	2 56 54.5	14.0	35.1	55.2	15.9	35.0	55.4	N.	12.2	32.0	51.8	11.0	30.5	50.6
	19	Trianguli, (772)	E.	N.	0 29 32.3	45.4	0.1	14.1	28.0	41.1	55.8	S.	49.0	3.6	17.3	31.1	45.8	0.0
	20		W.	S.	4 13 22.9	36.1	51.5	5.7	19.3	33.1	47.8	N.	42.1	56.1	10.0	23.8	37.1	52.0
	21	Bessel's Zone, 508	E.	S.	0 42 16.2	29.4	43.0	57.0	10.2	24.0	38.0	N.	33.3	47.7	1.4	14.9	29.0	42.8
	22		W.	N.	4 30 11.0	24.5	38.2	52.8	6.7	20.3	34.5	S.	29.5	43.5	57.8	10.9	24.6	38.0
	23	ο Persei*	E.	N.	0 54 32.0	51.3	0.5	11.0	21.0	30.8	40.0	S.	38.0	47.3	57.3	7.1	17.7	27.0
	24		W.	S.	6 12 45.8	5.3	14.2	25.0	34.9	44.5	54.2	N.	52.3	2.0	12.0	21.8	31.9	40.9
	25	Persei, (871)	E.	S.	1 31 23.3	46.1	8.5	31.5	54.1	17.0	40.4	N.	14.8	39.5	3.0	27.0	51.0	15.0
	26		W.	N.	3 45 16.5	41.5	5.2	29.9	53.7	17.5	42.2	S.	15.5	39.8	3.5	25.0	48.5	11.0
	27	ξ Persei	E.	S.	1 53 54.3	7.9	21.1	35.0	48.4	2.3	16.1	N.	11.7	25.8	40.0	53.2	7.2	21.2
	28		W.	N.	5 41 34.6	48.2	2.5	16.5	30.0	44.1	58.2	S.	53.8	7.1	21.0	34.9	48.1	2.4
	29	β Tauri	E.	N.	2 4 12.0	28.2	44.5	1.0	8.8	17.2	25.5	S.	46.0	54.5	3.0	10.8	27.0	44.0
	30		W.	S.	8 26 18.0	34.0	51.0	7.4	15.2	24.0	32.0	N	53.0	1.0	10.0	17.3	34.0	50.4
	31	Aurigæ, (1530)	E.	S.	3 39 ..	..	..	32.5	54.5	18.0	41.0	N.	13.8	37.3	1.5	25.0	..	..
	32		W.	N.	5 55 ..	..	..	24.8	48.0	11.7	35.8	S.	8.4	31.9	54.2	16.5	..	..
	33	Aurigæ, (2416)	E.	S.	5 47 0.8	20.0	38.0	56.0	14.0	33.0	52.0	N.	9.0	28.0	47.5	6.5	26.3	44.8
	34		W.	N.	8 32 36.2	55.4	15.1	34.9	53.0	12.6	32.0	S.	47.6	7.0	25.2	44.0	3.0	21.4
	†35	Bessel's Zone, 448	E.	S.	2 39 8.2	36.8	5.0	34.0	3.5	33.5	4.0	N.	9.0	41.0	15.0	48.0	23.0	1.0
	36		W.	N.	3 30 9.5	44.0	21.0	56.0	30.0	4.0	36.5	S.	42.0	13.0	43.0	13.0	41.5	11.0
23	37	ρ Persei	E.	N.	2 2 43.8	11.5	43.0	13.0	43.5	13.7	46.0	S.	50.0	23.2	56.0	28.5	3.1	39.5
	38		W.	S.	3 40 52.7	26.0	1.8	36.0	9.8	42.0	16.0	N.	19.6	51.0	21.6	51.8	22.0	54.0
	†39	Bessel's Zone, 448	E.	S.	2 39 18.0	45.0	13.0	42.0	13.0	41.0	..	N.	..	48.5	22.0	57.0	31.8	8.2
	40		W.	N.	3 30 15.5	53.0	30.5	3.5	39.5	13.0	..	S.	..	19.0	50.0	19.5	47.0	17.0
26	41	Andromedæ, (544)	E.	N.	0 18 23.5	41.7	2.0	21.5	40.8	59.8	19.9	S.	36.3	56.9	16.0	36.2	56.5	17.9
	42		W.	S.	2 57 7.7	27.0	48.5	8.8	28.9	48.5	8.7	N.	25.2	44.7	4.8	24.0	43.1	3.5

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Oct. 26	— 0.155	l1.567 l0.210
Nov. 3	+ 0.602	l0.115
20	+ 0.602	l0.023

* ο Persei over extra wires.

EXTRA WIRES.

		EAST. 1.			2.				WEST. 1.		
		h.	m.	s.	m.	s.			h.	m.	s.
Tel.	N.	0	53	53.0	54	12.2	Tel.	S.	6	12	6.8
"	S.	0	58	26.5	58	6.9	"	N.	6	16	39.5

	LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
	Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
	N.	S.	*Div.*	″	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	S.	″			
1 2	32.10 34.00	29.80 31.76	− 2.30 2.24	−1.71	0 15 31.28	− 2 24.79	+ 0.16	0 13 6.67	37 7 24.75	+ 7.74	+49.92	H.	6	ρ Andromedæ.
3 4	30.67 31.41	29.85 29.93	0.82 1.48	0.86	21 8 23.84	+ 0 0.17	− 0.08	21 8 23.93	38 36 59.33	6.49	22.07	H.	9	Anonymous.
5 6	30.85 32.00	29.95 30.25	0.90 1.75	1.00	21 46 27.30	+ 0.54 − 1.47	− 0.02	21 46 26.82	38 7 26.12	6.65	29.99	H.	7	Bessel's Zone, 314.
7 8	30.95 32.45	29.90 31.05	1.05 1.40	0.92	22 41 12.51	+ 0.20 − 1.14	+ 0.11	22 41 12.15	36 37 4.52	7.04	39.71	H.	6.7	Bessel's Zone, 379.
9 0	32.00 33.15	30.55 31.25	1.45 1.90	1.25	0 13 7.32	1.14	0.09	0 13 6.27	37 7 24.79	7.77	49.61	H.	6	ρ Andromedæ.
1 2	32.17 32.45	30.55 31.15	1.62 1.30	1.10	23 46 22.72	1.22	0.24	23 46 21.74	38 26 2.94	7.50	45.03	H.	7.8	Anonymous.
3 4	32.15 32.99	30.90 31.85	1.25 1.14	0.90	0 48 19.22	− 1.01	+ 0.17	0 48 18.38	37 40 13.47	8.11	51.11	H.	4	μ Andromedæ.
5 6	28.59 28.65	23.55 24.55	5.04 4.10	3.44	21 11 20.77	+ 4.00	− 0.13	21 11 24.64	38 45 43.15	5.57	22.37	H.	4	σ Cygni.
7 8	37.73 39.60	36.78 38.03	0.95 1.57	0.95	1 40 7.73	− 29.35	0.69	1 39 39.69	37 11 26.38	8.67	47.27	H.	6.7	Andromedæ, (544.)
9 0	37.60 38.60	37.15 37.90	0.45 0.70	0.43	2 23 18.57	29.40	0.62	2 22 48.55	35 27 58.52	8.99	45.11	H.	5.6	Trianguli, (772.)
1 2	38.12 40.00	37.47 39.10	0.65 0.90	0.55	2 38 3.85	29.41	0.62	2 37 33.82	35 20 14.41	9.10	43.90	H.	7.8	Bessel's Zone, 508.
3 4	38.45 40.20	37.52 39.42	0.93 0.78	0.63	3 35 16.17	29.47	0.59	3 34 46.11	31 47 53.59	9.37	37.35	H.	4	o Persei.
5 6	38.85 40.05	37.85 38.83	1.00 1.22	0.84	2 41 28.35	29.42	0.64	2 40 58.29	37 41 7.37	9.22	43.42	H.	4.5	Persei, (871.)
7 8	38.95 40.35	38.03 39.55	0.92 0.80	0.64	3 49 34.85	29.49	0.59	3 49 4.77	35 20 42.23	9.68	35.32	H.	5	ξ Persei.
9 0	38.95 41.05	38.00 40.30	0.95 0.75	0.63	5 17 9.18	29.58	0.59	5 16 39.01	28 28 12.36	9.79	18.37	H.	2	β Tauri.
1 2	39.93 40.10	38.88 39.75	1.05 0.35	0.52	4 49 24.68	29.55	0.49	4 48 54.64	37 39 2.98	10.29	+25.47	H.	5	Aurigæ, (1530.)
3 4	40.10 40.55	39.80 39.95	0.30 0.60	0.34	7 12 20.28	29.71	0.64	7 11 49.93	37 2 19.17	11.00	− 4.77	H.	5	Aurigæ, (2416.)
5 6	39.10 39.35	38.35 38.95	0.75 − 0.40	−0.43	3 8 22.93	29.44	0.44	3 7 53.05	38 42 59.84	9.51	+40.71	H.	7	Bessel's Zone, 448.
7 8	17.48 19.65	20.50 19.45	+ 3.02 − 0.20	+1.06	2 56 2.58	36.79	1.96	2 55 23.83	38 14 39.51	9.36	41.64	H.	4	ρ Persei.
9 0	19.48 19.55	18.98 19.25	0.50 − 0.30	−0.30	3 8 30.62	36.81	1.13	3 7 52.68	38 43 0.36	9.49	40.29	H.	7	Bessel's Zone, 448.
1 2	25.42 27.35	26.50 28.92	+ 1.08 + 1.57	+1.00	1 40 22.54	− 0 41.24	− 1.15	1 39 40.15	37 11 27.42	+ 8.70	+46.61	H.	6.7	Andromedæ, (544.

†Oct. 26. Commenced observing with a new clock.
The clock was stopped between the E. and W. transits of 15 and 17. The corrections for those stars belong to the times of observation E. and W.

15. Single revolutions of micrometer.
35. Single revolutions of micrometer.
39. Single revolutions of micrometer.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES.							Telescope.	TIMES OF TRANSIT OVI					
					A.	B.	C.	D.	E.	F.	G.		G.	F.	E.	D.	C.	B.
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.
Nov. 26	1	Trianguli, (772)	E.	S.	0 29 43.5	57.0	11.0	25.0	38.8	52.7	7.0	N.	3.7	18.0	32.0	45.8	0.0	14.
	2		W.	N.	4 13 35.0	49.0	3.0	17.4	31.5	45.4	0.0	S.	55.3	9.9	23.5	37.1	51.0	5.
	†3	Anonymous	E.	N.	0 47 10.9	27.0	44.5	1.5	18.0	35.0	..	S.	..	16.0	33.0	50.5	8.0	26.
	4		W.	S.	3 52 47.5	3.6	22.5	40.0	58.0	14.5	..	N.	..	56.8	14.0	30.8	48.0	5.
	5	Bessel's Zone, 527	E.	S.	1 6 56.2	17.5	38.0	59.0	19.6	40.8	2.0	N.	29.0	51.0	13.0	34.1	56.8	18.
	6		W.	N.	3 33 38.2	0.0	22.0	44.5	6.0	27.2	49.5	S.	16.8	38.6	59.0	20.0	41.2	1.
	7	Bessel's Zone, 527	E.	N.	1 21 21.5	54.4	32.0	8.0	44.0	20.0	58.5	S.	27.3	8.5	48.8	30.8	13.1	58.
	8		W.	S.	2 41 48.7	30.3	15.6	57.2	40.0	20.3	1.8	N.	31.8	10.0	46.0	23.0	58.7	36.
	9	ρ Persei	E.	S.	2 2 44.8	14.8	44.0	14.2	44.5	15.3	47.3	N.	55.7	29.3	3.0	36.0	10.7	44.
	10		W.	N.	3 40 55.3	30.8	5.3	39.3	12.1	45.0	19.2	S.	27.5	59.2	30.0	0.5	31.2	0.
Dec. 3	11	Bessel's Zone, 386	E.	S.	22 42 17.0	32.0	46.8	2.0	17.0	32.0	47.3	N.	47.9	3.8	19.0	34.0	50.0	4.
	12		W.	N.	2 8 34.7	50.2	5.1	21.0	36.0	51.4	7.0	S.	7.9	23.0	38.5	53.2	8.3	23.
	13	β Andromedæ	E.	S.	22 58 4.5	17.0	29.6	42.7	55.1	8.0	21.0	N.	12.6	25.9	38.5	51.5	5.0	17.
	14		W.	N.	3 1 48.0	1.0	14.0	27.0	39.8	52.5	6.0	S.	56.9	10.2	23.0	35.5	48.5	1.
	15	Bessel's Zone, 446	E.	N.	23 11 13.2	29.0	46.5	3.0	19.2	36.0	53.2	S.	59.9	17.5	34.1	51.5	8.9	27.
	16		W.	S.	2 15 23.0	39.5	57.9	15.0	32.4	49.1	6.9	N.	13.4	30.4	47.0	3.5	20.5	38.
	17	Bessel's Zone, 446	E.	N.	23 36 5.5	21.5	39.0	55.8	12.6	28.9	46.1	S.	51.9	9.5	26.5	43.3	1.0	19.
	18		W.	S.	2 40 36.6	52.9	11.0	28.3	45.2	1.9	19.9	N.	26.1	43.5	0.0	17.0	33.8	51.
	19	β Trianguli	E.	S.	23 49 46.0	57.8	9.9	21.9	33.6	45.5	57.8	N.	46.2	59.0	11.0	23.0	35.3	47.7
	20		W.	N.	4 8 51.8	4.0	16.0	28.5	40.5	52.7	5.0	S.	53.1	5.7	17.5	29.4	41.5	53.1
	21	Andromedæ, (649)	E.	S.	0 36 ..	47.0	6.0	25.3	44.0	3.0	22.7	N.	40.2	0.1	20.2	40.0	0.0	19.9
	22		W.	N.	3 18 ..	9.5	29.9	49.9	9.8	28.8	48.9	S.	6.2	26.2	45.5	3.7	23.5	41.9
	23	Bessel's Zone, 527	E.	N.	1 7 ..	..	..	45.9	6.8	27.1	49.1	S.	13.0	35.1	56.5	18.5	..	..
	24		W.	S.	3 34 ..	..	..	27.5	49.5	11.0	32.5	N.	57.0	18.5	39.0	0.0	..	..
9	25	Andromedæ, (516)	E.	S.	23 25 7.5	19.8	31.6	44.2	56.2	8.5	21.1	N.	10.9	23.5	36.0	48.1	1.0	13.1
	26		W.	N.	3 38 26.0	38.4	50.9	3.0	15.5	28.1	41.0	S.	30.8	43.5	55.6	7.9	20.0	32.1
	27	Bessel's Zone, 446	E.	N.	23 35 49.0	5.0	22.2	39.0	..	..	..	S.	..	..	..	27.5	44.5	2.8
	28		W.	S.	2 40 20.5	36.8	55.0	12.0	..	..	..	N.	..	..	..	1.0	17.7	35.0
	29	β Trianguli	E.	S.	23 49 29.5	41.5	52.5	5.1	17.0	29.0	..	N.	..	43.0	55.0	7.0	19.2	31.0
	30		W.	N.	4 8 36.0	47.9	0.0	11.9	24.6	36.0	..	S.	..	49.2	1.0	13.1	25.5	37.1
	31	Bessel's Zone, 446	E.	N.	0 9 36.0	52.0	9.0	26.0	43.0	59.0	16.0	S.	21.0	38.8	55.8	13.0	30.0	48.8
	32		W.	S.	3 14 40.0	57.0	16.0	32.0	49.0	6.5	23.8	N.	29.6	46.8	3.0	20.0	37.0	54.0
	33	Andromedæ, (544)	E.	S.	0 17 51.2	10.9	30.0	49.0	8.1	28.2	48.4	N.	6.1	27.0	47.5	6.9	27.5	47.8
	34		W.	N.	2 56 32.8	53.0	13.0	33.8	53.5	14.0	34.0	S.	52.8	13.2	32.8	52.3	11.5	31.0
	35	Anonymous	E.	S.	0 46 38.0	..	12.0	..	..	..	..	N.	..	..	..	..	39.0	..
	36		W.	N.	3 48 42.0	..	17.2	..	..	..	..	S.	..	..	..	..	45.0	..
	37	Bessel's Zone, 446	E.	N.	0 53 3.0	18.8	37.0	54.0	11.0	27.2	45.0	S.	52.0	9.8	26.6	44.0	2.4	20.0
	38		W.	S.	3 55 15.5	33.2	50.4	8.6	26.5	42.8	1.0	N.	8.0	25.8	42.0	59.0	16.8	34.1
12	39	Persei, (871)	E.	N.	1 30 58.8	20.0	43.6	6.3	29.0	52.0	15.8	S.	48.0	12.0	35.2	59.5	23.8	49.0
	40		W.	S.	3 44 49.5	12.5	38.2	2.0	26.0	49.5	14.0	N.	45.8	9.7	31.7	54.5	17.9	40.9
	41	Anonymous	E.	N.	2 10 ..	..	..	..	26.0	33.0	46.0	S.	52.0	55.0	35.0	..	..	..
	42		W.	S.	2 23 ..	..	..	..	50.0	30.0	35.0	N.	45.0	0.0	5.0	..	..	..

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Nov. 23	+ 1.224	*l* 0.080
26	1.224	.090
Dec. 3	1.224	.096
9	1.224	.100
12	+ 0.393	*l* 0.012

3. Doubtful, if the same star be observed in East and West.

EVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N.Declination	R. A.	Decl.			
N.	S.	Div.	"	H. M. S.	M. S.	S.	H. M. S.	° ' "	S.	"			
5.30 7.80	26.90 29.72	+ 1.60 1.92	+1.32	2 23 31.38	—0 41.19	—1.19	2 22 49.00	35 27 59.68	+ 8.99	+44.43	H.	5.6	Trianguli, (772.)
5.35 7.60	27.35 29.45	2.00 1.85	1.44	2 22 15.65	41.19	1.24	2 21 33.22	36 33 18.38	8.99	44.40	H.	9	Anonymous.
5.60 7.45	27.72 29.10	2.12 1.65	1.41	2 23 9.43	41.19	1.29	2 22 26.95	37 26 31.03	9.05	44.22	H.	8	Bessel's Zone, 527.
6.10 7.32	27.94 28.65	1.84 1.33	1.19	2 6 44.77	41.22	1.37	2 6 2.18	38 27 16.37	8.94	45.21	H.	8	Bessel's Zone, 527.
6.55 7.45	28.55 29.10	2.00 + 1.65	+1.37	2 56 7.46	41.15	1.30	2 55 25.01	38 14 38.20	9.35	41.26	H.	4	ρ Persei.
2.35 4.23	21.10 23.00	— 1.25 1.23	—0.93	0 27 27.54	25.57	1.22	0 27 0.75	35 59 34.69	8.27	46.51	H.	8	Bessel's Zone, 386.
2.25 5.10	21.35 23.05	0.90 2.05	1.10	1 1 39.15	25.53	1.32	1 1 12.30	34 48 41.20	8.47	47.21	H.	2.3	β Andromedæ.
2.27 4.50	21.42 22.95	0.85 1.55	0.90	0 45 33.32	25.55	1.31	0 45 6.46	36 35 29.16	8.38	46.76	H.	7	Bessel's Zone, 446.
2.25 5.12	22.00 22.88	0.25 2.24	0.94	1 10 36.08	25.51	1.48	1 10 9.09	36 34 57.47	8.54	46.77	H.	7	Bessel's Zone, 446.
3.00 5.45	21.35 23.55	1.65 1.90	1.33	2 0 55.66	25.43	1.24	2 0 28.99	34 15 46.79	8.83	45.45	H.	4	β Trianguli.
3.45 5.15	21.95 23.15	1.50 2.00	1.31	1 59 44.66	25.43	1.29	1 59 17.94	37 7 58.08	8.89	45.03	H.	5.6	Andromedæ, (649.)
3.95 5.40	22.05 23.10	1.90 2.30	1.58	2 22 52.95	25.39	1.28	2 22 26.28	37 26 32.51	9.05	43.46	H.	8	Bessel's Zone, 527.
9.60 1.70	28.15 30.60	1.45 1.10	0.96	1 33 25.86	9.06	1.20	1 33 15.60	34 28 25.93	8.72	46.32	H.	6	Andromedæ, (516.)
9.65 1.10	27.78 30.10	1.87 1.00	1.08	1 10 19.90	9.09	1.12	1 10 9.69	36 34 56.68	8.61	46.42	H.	7	Bessel's Zone, 446.
9.90 1.75	28.05 31.15	1.85 0.60	0.92	2 0 39.39	9.01	1.12	2 0 29.26	34 15 46.71	8.87	45.02	H.	4	β Trianguli.
9.95 1.69	28.50 30.25	1.45 1.44	1.09	1 44 22.77	9.03	1.22	1 44 12.57	36 34 5.47	8.82	45.42	H.	8.9	Bessel's Zone, 446.
0.16 1.20	28.55 30.25	1.61 0.95	0.96	1 39 50.49	9.04	1.13	1 39 40.32	37 11 28.34	8.80	45.49	H.	6.7	Andromedæ, (544.)
0.35 1.75	29.30 31.05	1.05 0.70	0.65	2 19 58.19	8.98	1.18	2 19 48.03	36 38 39.92	9.05	43.25	H.	9	Anonymous.
0.40 1.75	29.45 31.13	0.95 0.62	0.59	2 26 26.47	8.97	1.18	2 26 16.32	36 38 27.20	9.09	42.77	H.	6.7	Bessel's Zone, 446.
4.40 5.25	32.75 33.28	1.65 1.97	1.36	2 41 0.69	1.75	0.45	2 40 58.49	37 41 9.91	9.24	40.99	H.	4.5	Persei, (871.)
4.60 4.60	33.15 33.15	1.45 — 1.45	—1.09	2 23 14.30	—0 1.75	—0.39	2 23 12.15	38 52 18.61	+ 9.83	+11.31	H.		Anonymous.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES. A.	B.	C.	D.	E.	F.	G.	Telescope.	TIMES OF TRANSIT OVER G.	F.	E.	D.	C.	B.
					H. M. S.	s.	s.	s.	s.	s.	s.		s.	s.	s.	s.	s.	s.
Dec. 13	1	β Andromedæ	E.	N.	22 57 ..	52.2	5.5	18.8	31.2	43.9	56.9	S.	46.3	59.9	12.5	25.4	38.2	52.0
	2		W.	S.	3 1 ..	36.4	50.4	3.0	16.0	28.8	42.0	N.	32.2	45.2	58.0	10.9	23.4	36.9
	3	Bessel's Zone, 446 . .	E.	S.	23 10 47.0	3.0	20.0	36.5	53.3	10.5	..	N.	..	53.8	10.6	27.0	45.0	2.0
	4		W.	N.	2 14 57.5	15.1	32.5	49.8	6.8	24.0	..	S.	..	6.1	23.5	40.0	57.0	13.7
	5	β Trianguli	E.	N.	23 49 22.2	33.3	46.0	58.0	10.5	21.8	34.1	S.	20.8	33.0	45.0	57.0	9.2	22.0
	6		W.	S.	4 8 28.2	40.0	53.0	5.1	17.0	29.0	41.8	N.	29.0	40.8	52.5	4.9	16.5	29.0
	†7	Andromedæ, (580) . .	E.	S.	0 11 4.0	21.0	37.0	53.2	9.6	26.2	43.2	N.	50.0	8.0	24.8	41.2	58.5	15.3
	8		W.	N.	3 18 46.0	3.2	20.0	37.2	54.0	10.5	28.0	S.	34.5	52.0	8.2	24.5	41.5	57.0
	†9	Andromedæ, (579) . .	E.	S.	0 11 21.5	37.5	54.0	10.5	27.0	44.0	..	N.	..	25.5	42.2	59.2	16.5	33.5
	10		W.	N.	3 18 2.2	20.0	36.0	54.0	10.2	27.5	..	S.	..	9.0	26.0	42.0	58.5	15.0
	11	Bessel's Zone, 446 . .	E.	N.	0 52 55.0	11.0	28.5	45.8	3.0	19.2	36.8	S.	44.0	1.6	19.0	36.0	54.0	12.5
	12		W.	S.	3 55 8.0	24.5	42.9	0.1	17.9	34.9	52.5	N.	0.3	17.9	34.2	51.4	8.5	26.0
	13	Anonymous	E.	S.	1 29 ..	..	25.2	56.5	27.2	58.5	31.0	N.	40.2	15.0	49.0	23.0	58.2	..
	14		W.	N.	3 5 ..	..	41.0	15.8	49.2	24.0	58.4	S.	8.0	40.0	12.0	42.0	14.0	..
	†15	Andromedæ, (661) . .	E.	N.	1 11 ..	27.5	0.0	32.2	4.5	36.0	9.0	S.	22.0	58.8	33.0	8.8	45.0	23.8
	16		W.	S.	2 43 ..	58.0	36.0	13.8	49.2	23.6	59.0	N.	13.4	46.5	18.2	51.0	22.0	55.0
	†17	Andromedæ, (662) . .	E.	N.	1 11 7.0	37.0	9.0	41.5	13.5	45.3	19.0	S.	32.5	8.5	43.3	19.0	56.0	34.4
	18		W.	S.	2 43 13.3	48.5	27.0	4.0	39.5	14.8	50.5	N.	4.8	38.0	9.8	42.2	14.0	47.2
	19	Anonymous	E.	S.	1 47 6.8	32.0	58.0	24.0	50.5	16.5	43.8	N.	31.9	59.5	28.4	56.1	24.6	53.1
	20		W.	N.	3 42 29.0	58.0	26.5	55.3	22.8	51.0	19.2	S.	6.4	33.4	0.2	26.0	53.0	18.5
14	21	α Andromedæ	E.	N.	20 45 58.2	15.0	31.0	38.5	47.0	55.0	3.4	S.	7.1	15.2	23.3	32.0	39.6	56.0
	22		W.	S.	3 11 52.0	9.0	25.1	32.9	41.4	49.5	58.0	N.	1.0	9.1	17.6	26.0	33.6	49.9
	23	Bessel's Zone, 446 . .	E.	N.	23 37 ..	42.5	2.5	21.8	41.0	0.2	20.5	S.	37.2	58.4	18.0	38.5	59.0	20.6
	24		W.	S.	2 15 ..	25.0	46.0	6.5	27.0	47.0	7.6	N.	25.7	45.8	5.0	24.5	44.2	3.9
	25	β Trianguli	E.	S.	23 49 20.9	32.6	44.2	56.4	8.5	20.3	..	N.	..	34.0	46.4	58.0	10.4	22.8
	26		W.	N.	4 8 28.0	40.4	52.0	4.3	16.3	28.2	..	S.	..	41.7	53.2	5.1	17.7	29.5
	27	Andromedæ, (580) . .	E.	N.	0 11 5.0	21.0	38.0	54.5	10.8	27.0	44.0	S.	48.5	5.5	22.5	39.0	56.0	14.0
	28		W.	S.	3 18 47.0	3.0	20.2	37.9	55.0	11.8	29.0	N.	33.0	50.5	6.9	23.5	39.8	56.5
	29	Andromedæ, (579) . .	E.	N.	0 11 22.5	38.5	55.5	12.0	28.5	..	..	S.	..	..	40.0	57.3	15.0	32.0
	30		W.	S.	3 18 3.0	19.0	37.5	55.0	11.9	..	..	N.	..	..	24.0	40.5	58.0	15.0
	31	Anonymous	E.	S.	0 47 58.5	16.5	34.6	53.4	11.5	29.5	49.4	N.	3.8	24.0	42.0	1.2	20.5	39.9
	32		W.	N.	3 34 18.5	38.0	56.5	16.0	35.0	54.0	13.7	S.	27.8	47.5	5.0	24.0	42.6	1.0
	33	Bessel's Zone, 446 . .	E.	N.	0 53 ..	10.5	28.0	45.4	2.5	19.0	36.2	S.	43.5	1.6	18.0	35.1	53.0	12.0
	34		W.	S.	3 55 ..	24.2	43.0	0.6	17.9	35.1	52.8	N.	0.0	17.1	34.0	51.2	8.0	25.8
	†35	Anonymous	E.	S.	1 30 ..	..	..	..	26.8	59.0	31.5	N.	42.0	15.2	49.0	..	..	..
	36		W.	N.	3 6 ..	..	..	..	48.8	22.0	57.9	S.	8.0	41.2	12.0	..	..	..
	37	Bessel's Zone, 527 . .	E.	S.	1 4 6.5	25.5	43.5	2.9	21.5	40.0	59.0	N.	15.0	35.6	54.0	14.0	33.3	52.5
	38		W.	N.	3 48 37.0	57.0	16.3	36.1	55.3	14.6	34.5	S.	50.2	10.5	28.6	47.0	6.0	24.4
	†39	Andromedæ, (661) . .	E.	N.	1 10 57.0	25.8	0.5	31.0	4.4	35.4	9.0	S.	22.2	58.9	32.8	9.5	46.0	25.0
	40		W.	S.	2 43 23.0	59.0	37.5	12.5	49.5	24.4	59.7	N.	12.7	47.6	17.5	50.0	22.0	54.2
	†41	Andromedæ, (662) . .	E.	N.	1 11 6.0	36.4	10.0	41.0	14.0	46.0	20.0	S.	34.0	10.0	43.2	20.9	56.6	35.0
	42		W.	S.	2 43 14.0	49.5	28.0	3.4	39.5	14.8	50.5	N.	3.5	37.6	9.5	41.8	14.0	46.0

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Dec. 13	+ 0.393	l 0.012
14	+ 0.953	l 0.012

7 & 9. Observed at same time.
15 & 17. Observed at same time.

EVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N.Declination	R. A.	Decl.			
N.	S.	*Div.*	"	H. M. S.	M. S.	S.	H. M. S.	° ' "	S.	"			
3.30 5.15	32.50 33.45	— 0.80 1.70	—0.94	1 1 14.41	— 0 1.68	—0.47	1 1 12.26	34 48 40.64	+ 8.60	+47.81	H.	2.3	β Andromedæ.
3.25 4.67	32.60 32.97	0.65 1.70	0.88	0 45 8.55	1.68	0.52	0 45 6.35	36 35 28.79	8.51	46.40	H.	7	Bessel's Zone, 446.
3.55 5.25	32.59 34.00	0.96 1.25	0.83	2 0 31.21	1.67	0.42	2 0 29.12	34 15 46.38	8.90	44.79	H.	4	β Trianguli.
3.47 5.09	32.80 33.55	0.67 1.54	0.83	1 47 9.10	1.67	0.50	1 47 6.93	36 30 4.15	8.88	45.05	H.	6	Andromedæ, (580.)
3.47 5.09	32.80 33.55	0.67 1.54	0.83	1 46 56.46	1.67	0.50	1 46 54.29	36 31 38.20	8.88	45.05	H.	7	Andromedæ, (579.)
3.92 5.20	33.00 33.93	0.92 1.27	0.83	2 26 18.45	1.67	0.43	2 56 16.35	36 38 27.53	9.24	40.59	H.	6.7	Bessel's Zone, 446.
3.93 5.05	33.30 33.60	0.63 1.45	0.79	2 20 49.62	1.67	0.59	2 20 47.16	38 16 13.94	9.14	42.54	H.	9	Anonymous.
3.97 4.80	33.02 33.37	0.95 1.43	0.89	2 1 41.10	1.67	0.51	2 1 38.92	38 18 59.84	9.01	43.84	H.	6	Andromedæ, (661.)
3.97 4.80	33.02 33.37	0.95 1.43	0.89	2 1 41.66	1.67	0.51	2 1 39.48	38 19 13.72	9.01	43.82	H.	7	Andromedæ, (662.)
4.20 4.83	33.10 33.60	1.10 1.23	0.88	2 48 25.45	1.66	0.42	2 48 23.37	37 59 49.44	9.31	40.14	H.	6	Anonymous.
5.05 6.90	33.60 36.50	1.45 0.40	0.69	0 0 32.32	1.15	0.90	0 0 30.27	28 14 57.90	8.46	47.36	H.	1	α Andromedæ.
5.40 6.55	34.45 35.15	0.95 1.40	0.88	0 58 52.89	1.14	1.01	0 58 50.74	37 12 45.73	8.61	46.19	H.	8	Bessel's Zone, 446.
5.40 6.90	34.30 36.50	1.10 0.40	0.56	2 0 31.11	1.13	0.90	2 0 29.08	34 15 46.16	8.91	44.85	H.	4	β Trianguli.
5.35 7.00	34.57 36.30	0.78 0.70	0.55	1 47 8.65	1.13	0.94	1 47 6.58	36 30 4.06	8.89	44.99	H.	6	Andromedæ, (580.)
5.35 7.00	34.57 36.30	0.78 0.70	0.55	1 46 56.17	1.13	0.94	1 46 54.10	36 31 38.51	8.89	45.01	H.	7	Andromedæ, (579.)
5.70 7.05	34.60 36.30	1.10 0.75	0.69	2 13 38.66	1.13	0.90	2 13 36.63	37 1 17.17	9.18	42.93	H.	9	Anonymous.
6.05 7.00	34.55 36.52	1.50 0.48	0.74	2 26 18.10	1.13	0.83	2 26 16.14	36 38 26.98	9.12	42.35	H.	6.7	Bessel's Zone, 446.
5.97 6.70	34.90 35.60	1.07 1.10	0.82	2 20 49.38	1.13	0.96	2 20 47.29	38 16 14.60	9.15	42.47	H.	9	Anonymous.
5.92 7.00	34.65 36.55	1.27 0.45	0.64	2 28 54.85	1.12	0.84	2 28 52.89	37 3 45.88	9.35	42.05	H.	7.8	Bessel's Zone, 527.
5.85 6.65	34.73 35.55	1.12 1.10	0.84	2 1 41.07	1.13	0.95	2 1 38.99	38 18 59.77	9.02	43.78	H.	6	Andromedæ, (661.)
5.85 6.65	34.73 35.55	1.12 — 1.10	—0.84	2 1 41.88	— 0 1.13	—0.95	2 1 39.80	38 19 14.29	+ 9.02	+43.78	H.	7	Andromedæ, (662.)

35. Wires A. and C. rejected in the reduction.
39 & 41. Observed at same time.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

DATE. 1846.	No. for ref.	OBJECTS.	Vertical.	Telescope.	TIMES OF TRANSIT OVER WIRES. A.	B.	C.	D.	E.	F.	G.	Telescope.	TIMES OF TRANSIT OVER WI G.	F.	E.	D.	C.	B.	
					H. M. S.	S.	S.	S.	S.	S.	S.		S.	S.	S.	S.	S.	S.	M.
Dec. 15	1	α Lyræ	E.	S.	17 55 11.0	54.5	38.8	24.8	9.8	57.0	47.4	N	12.7	10.2	7.0	6.9	9.1	14.7	9
	2		W.	N.	18 54 6.5	16.0	20.2	24.6	23.3	20.0	19.5	S.	46.8	37.9	24.0	9.9	54.7	38.8	8
	3	α Andromedæ	E.	N.	20 45 58.6	15.0	31.2	38.8	47.0	55.0	3.4	S.	7.0	15.2	23.2	32.0	39.7	55.9	49
	4		W.	S.	3 11 52.5	9.1	25.2	33.0	41.4	49.5	58.0	N.	1.4	9.5	17.8	26.0	34.0	49.5	15
	5	Anonymous	E.	N.	23 34 40.8	58.0	16.5	34.7	52.8	10.0	28.9	S.	40.0	59.0	17.6	36.0	55.0	14.5	39
	6		W.	S.	2 37 59.8	17.0	37.0	55.0	14.3	33.0	51.0	N.	2.9	21.3	39.0	57.2	15.2	34.0	42
	7	Andromedæ, (544)	E.	N.	0 18 ..	..	..	41.4	0.5	20.0	39.8	S.	56.8	17.1	36.9	56.8	17.1	38.0	22
	8		W.	S.	2 57 ..	..	..	26.2	47.2	6.3	27.0	N.	43.8	4.0	23.0	41.8	..	..	0
18	†9	α Lyræ	E.	N.	17 57 ..	..	..	27.5	13.8	0.0	49.3	S.	11.2	8.3	5.8	5.4	..	..	6
	†10		W.	S.	18 56 ..	..	..	32.8	32.0	29.3	26.8	N.	52.2	42.0	27.8	14.3	..	..	6
23	†11	Andromedæ, (580)	E.	N.	0 11 4.5	19.5	37.0	53.5	10.5	26.4	..	S.	..	5.5	22.0	39.0	56.0	13.0	15 3
	†12		W.	S.	3 18 47.0	3.5	21.0	37.7	55.0	11.5	..	N.	..	51.5	8.0	24.0	40.5	57.5	23 1
	†13	Andromedæ, (579)	E.	N.	0 11 21.0	37.5	54.0	11.0	27.2	43.8	..	S.	..	23.4	40.0	57.0	14.0	32.0	15 4
	†14		W.	S.	3 18 3.2	19.0	37.3	54.5	11.2	27.7	..	N.	..	8.5	25.0	42.0	58.0	15.2	22 3
	15	Andromedæ, (544)	E.	S.	0 17 41.8	0.8	20.0	39.5	58.0	18.0	38.0	N.	56.5	17.8	37.0	57.5	18.0	38.0	22 58
	16		W.	N.	2 56 25.3	45.9	5.4	26.0	46.0	5.5	27.0	S.	44.5	5.4	24.0	43.8	3.6	22.0	1 41
	17	Trianguli, (772)	E.	N.	0 29 4.5	17.8	32.5	46.0	0.0	13.9	27.9	S.	21.8	36.5	50.4	4.5	18.5	33.9	32 46
	18		W.	S.	4 12 54.1	8.0	22.9	37.0	51.0	5.0	19.0	N.	14.0	27.5	41.5	54.8	9.0	23.7	16 36
	19	ρ Persei	E.	S.	2 2 7.0	36.5	6.0	36.8	6.5	37.2	10.0	N.	15.2	50.5	23.5	55.0	29.8	3.2	10 38
	20		W.	N.	3 40 15.5	50.6	24.0	59.5	31.5	5.0	39.0	S.	44.0	16.4	47.4	17.2	47.8	17.0	48 46

DATE.	AZIMUTH ERROR.	CLOCK'S H. RATE.
	s.	s.
Dec. 15	+ 0.953	*l* 0.012
18	.953	
23	+ 0.953	*l* 0.065

9. Clock stopped and regulated, but not compared with others.

No. for re	LEVEL READINGS.			Corr. for Level.	MEAN OF WIRES.	CORRECTION FOR		OBSERVED		REDUCTION TO 1850.0		Observer.	Magnitude.	OBJECTS.
	Means.		Diff.			Clock.	Azimuth and Chg. of Lev.	R. Ascension.	N. Declination	R. A.	Decl.			
	N.	S.	*Div.*	"	H. M. S.	M. S.	S.	H. M. S.	° ′ ″	S.	"			
1 2	36.55 35.75	36.45 35.96	— 0.10 + 0.21	+0.05	18 31 46.22	— 0 0.99	— 0.83	18 31 44.40	38 38 54.71	+ 7.52	— 3.70	H.	1	*a* Lyræ.
3 4	34.90 37.30	35.05 37.55	0.15 0.25	0.15	0 0 32.42	0.91	0.95	0 0 30.56	28 14 58.34	8.47	+47.42	H.	1	*a* Andromedæ.
5 6	35.95 37.05	36.40 37.70	0.45 0.65	0.41	1 8 45.80	0.90	0.93	1 8 43.97	36 36 48.43	8.68	46.21	H.	7	Anonymous.
7 8	36.20 37.05	36.47 37.75	0.27 0.70	0.36	1 39 41.71	0.89	0.89	1 39 39.93	37 11 29.29	8.87	+45.13	H.	6.7	Andromedæ, (544.)
9 10	33.70 33.45	36.05 35.53	2.35 2.08	1.67	18 31 50.05				38 38 53.69	7.52	— 2.81	H.	1	*a* Lyræ.
11 12	36.15 38.00	38.50 40.60	2.35 2.60	1.86	1 47 8.60	1.16	0.92	1 47 6.52	36 30 4.35	9.00	+44.64	H.	6	Andromedæ, (580.)
13 14	36.15 38.00	38.50 40.60	2.35 2.60	1.86	1 46 55.92	1.16	0.92	1 46 53.84	36 31 39.63	9.00	44.64	H.	7	Andromedæ, (579.)
15 16	35.95 37.70	38.85 40.30	2.90 2.60	2.07	1 39 41.58	1.15	1.00	1 39 39.43	37 11 29.15	8.97	44.86	H.	6.7	Andromedæ, (544.)
17 18	36.10 38.40	38.85 41.15	2.75 2.75	2.07	2 22 50.67	1.19	0.95	2 22 48.53	35 28 1.72	9.15	42.33	H.	5.6	Trianguli, (772.)
19 20	37.00 38.30	39.85 40.70	2.85 + 2.40	+1.98	2 55 27.04	— 0 1.23	— 1.06	2 55 24.75	38 14 40.87	+ 9.43	+38.57	H.	4	*ρ* Persei.

11 & 13. Observed at same time.

ASSUMED LATITUDE 38° 53′ 38″.80 NORTH.

OBSERVATIONS

WITH

THE EQUATORIAL.

1845-6.

NATIONAL OBSERVATORY.

June 25—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star *r* . . .	6 16 1.3		+ 0 44.7		
Star *s* . . .	16 3.4		+ 0 42.6		
Star *t* . . .	16 36.0	(40.000)	+ 0 10.0	— 5.959	C.
Comet . . .	16 46.0	34.041			
Star *u* . . .	21 20.0*	67.170	— 4 34.0	— 33.129	
Comet . . .	24 30.0	(40.000)			
Star *u* . . .	29 3.5	71.874	— 4 33.5	— 31.874	
Comet . . .	30 57.0	(40.000)			
Star *u* . . .	6 35 29.5	70.910	— 4 32.5	— 30.910	

Corr. of Chron. . . h. m. s. +9 19 37.7.

	h. m. s.	° ′ ″
Star *r*	8 31 59.67	
Star *s*	8 32 2.20	
Star *t*	8 32 34.66	+ 29 26 15.79

	Sid. time. h. m. s.		m. s.		′ ″
Comet—Star *r* .	15 31 2.2	+	44.12		
Δ ρ . . .			.00		
Comet—Star *s* .	15 31 2.2	+	42.10		
Δ ρ . . .		—	.70		
Comet—Star *t* .	15 31 2.2	+	9.33	—	1 43.93
Δ ρ . . .		—	.04	—	.58
Comet—Star *u* .	15 43 42.0	—	4 33.33	—	8 12.54
Δ ρ . . .		—	.21	—	2.81

July 1.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α.	Comet—Star. Δ mic.	Observer.
Star *v* . . .	15 46 0.5	(40.000)	+ 1 39.3	+ 15.782	C.
Comet . . .	47 39.8	55.782			
Star *v* . . .	49 19.8	(40.000)	+ 1 39.2	+ 15.745	
Comet . . .	50 59.0	55.745			
Star *v* . . .	52 34.0	(40.000)	+ 1 39.2	+ 15.834	
Comet . . .	15 54 13.2	55.834			

Corr. of Chron. . . m. s. — 18 26.5.

	h. m. s.	° ′ ″
Star *v*	8 49 43.06	+ 24 33 31.76

	Sid. time. h. m. s.		m. s.		′ ″
Comet—Star *v* .	15 32 30.8	+	1 39.23	+	4 3.22
Δ ρ . . .		+	.09	+	1.23

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* Recorded 10.0.

2. Observations of Encke's Comet, 1845.

This Comet was observed here but twice, viz: on July 10 by Professor Coffin, and July 11 by Professor Hubbard. It was so faint as to be scarcely discernible.

July 10.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star *a* . . .	23 3 42.5	(40.000)	+ 0 12.5	0.000	C
Comet . . .	3 55.0	(40.000)			
Star *b* . . .	4 5.0		— 0 10.0		
Star *a* . . .	5 18.0	(40.000)	+ 0 12.0	0.000	
Comet . . .	5 30.0	(40.000)			
Star *b* . . .	5 39.5		— 0 9.5		
			(*b*—*a*)	(*b*—*a*)	
Star *a* . . .	7 31.0	(40.000)	+ 0 22.0	— 5.084	
Comet . . .	(invisible)				
Star *b* . . .	23 7 53.0	34.916			

Corr. of Chron. . . m. s. — 18 40.5.

	h. m. s.	° ′ ″
Star *a*	5 39 2.42	+ 29 41 16.55
Star *b*	5 39 24.53	29 40 0.04

	Sid. time. h. m. s.		m. s.		′ ″
Comet—Star *a* .	22 46 2.0	+	12.25		0.00
Δ ρ . . .			0.00		0.00
Comet—Star *b* .	22 46 2.0	—	9.75	+	1 18.33
Δ ρ . . .		—	.02	+	.31

July 11.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α.	Comet—Star. Δ mic.	Observer.
Star *c* . . .	22 56 42.0	(40.000)	+ 0 12.0	— 1.592	H
Comet . . .	56 54.0	38.408			
Star *c* . . .	58 12.0	(40.000)	+ 0 13.0	— 1.717	
Comet . . .	58 25.0	38.283			
Star *c* . . .	59 10.0	(40.000)	+ 0 12.0	— 1.778	
Comet . . .	22 59 22.0	38.222			
Star *d* . . .	23 0 11.5	52.600	— 0 49.5	— 14.378	

Corr. of Chron. . . m. s. — 18 41.2.

	h. m. s.	° ′ ″
Star *c*	5 45 36.85	29 39 56.98
Star *d*	5 46 37.45	29 43 9.46

	Sid. time. h. m. s.		m. s.		′ ″
Comet—Star *c* .	22 39 32.5	+	12.33	—	0 26.13
Δ ρ . . .		+	.01	—	.17
Comet—Star *d* .	22 40 40.8	—	49.50	—	3 41.52
Δ ρ . . .		+	.11	—	1.52

3. OBSERVATIONS OF BIELA'S COMET, 1846.

Comet was first seen by Lieutenant MAURY on the 12th of January, erved as often as practicable until the 19th of April.

JANUARY 12.

ject.	Chron. times of transit.	Mic. readings.	Comet—Star.		Observer.
			Δ a	Δ mic.	
	h. m. s.	*Revs.*	m. s.	*Revs.*	
. . .	3 1 50.0	(33.930)			M.[*]
. . .	3 26.0	33.625	— 1 36.0	+ 0.305	
. . .	10 18.0	(33.930)			
. . .	11 52.5	34.287	1 34.5	— 0.357	
. . .	15 16.2	(33.930)			
. . .	3 16 50.8	33.465	— 1 34.6	+ 0.465	

Corr. of Chron. . . . . + 2.5 s.

	h. m. s.	° ′ ″
a	23 54 13.16	— 0 26 29.65

	Sid. time. h. m. s.	m. s.	″
et—Star a .	3 9 10.6	— 1 35.03	+ 2.13
. . .		.00	.00

t does not bear illumination: measures difficult and not reliable.

JANUARY 13.

. . .	1 41 8.0	(34.028)	+ 1 7.0	— 11.826	M.
. . .	42 15.0	22.202			
. . .	44 54.8	(34.028)	1 8.0	11.826	
. . .	46 2.8	22.202			
. . .	47 56.8	(34.028)	1 8.2	11.686	
. . .	49 5.0	22.342			
. . .	53 11.8	(34.028)	1 9.2	12.448	
. . .	54 21.0	21.580			
. . .	56 25.2	(34.028)	1 9.8	12.400	
. . .	57 35.0	21.628			
. . .	2 16 41.2	20.300			H.
. . .	16 46.5	(34.028)			
. . .	19 54.5	20.463	1 12.0	— 12.709	
. . .	19 59.8	(34.028)	+ 1 6.7	— 26.274	
. . .	2 21 6.5	7.754			

JANUARY 13—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star.		Observer.
			Δ a	Δ mic.	
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star a . . .	2 22 54.5	20.523			H.
Star b . . .	22 59.0	(34.028)			
Star a . . .	25 27.7	20.485	+ 1 12.3	— 12.693	
Star b . . .	25 32.5	(34.028)	+ 1 7.5	— 26.236	
Comet . . .	2 26 40.0	7.792			

Corr. of Chron. . . . . + 7.5 s.

	h. m. s.	° ′ ″
Star a	23 54 13.15	— 0 26 29.63
Star b	23 54 18.21	

	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star a .	1 59 42.5	+ 1 9.50	— 3 8.37
Δ ρ . . .		.00	— .12
Comet—Star b .	2 24 0.7	+ 1 7.10	— 6 44.48
Δ ρ . ., .		— .01	— .24

The Comet appeared double, or rather a nebula or a fainter comet was in the same field, 1′ or 2′ N. and about 4*s*. preceding. It was too faint to be observed with sufficient accuracy to test its nature, nebulous or cometary.

JANUARY 14.

Clear night and calm. Haze about the horizon. It is now evident that the Comet is double. The companion appears as bright as the principal one did in the moonlight of Jan. 12th. It will be denoted throughout the following series of observations as B^2, the principal comet being called B^1.

B^2	2 3 25.0	37.650	+ 0 4.0	— 3.708	M.
B^1	3 29.0	(33.942)			
Star c . . .	4 27.0	42.136	— 0 58.0	— 8.194	
Star d . . .	9 30.0	28.546	— 6 1.0	+ 5.396	
B^2	13 41.5	39.318	+ 0 3.5	— 5.376	
B^1	13 45.0	(33.942)			
Star c . . .	14 41.8	42.750	— 0 56.8	— 8.808	
Star d . . .	19 44.0	28.212	— 5 59.0	+ 5.730	
B^2	22 3.0	39.568	+ 0 5.5	— 5.626	
B^1	22 8.5	(33.942)			
Star d . . .	28 5.8	28.325	— 5 57.3	+ 5.617	
B^2	45 25.0	38.946	+ 0 3.0	— 4.004	C.
B^1	45 28.0	(34.942)			
Star c . . .	46 20.0	43.628	— 0 52.5	— 8.686	
Star d . . .	2 51 22.0	28.120	— 5 54.0	+ 6.822	

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[*] Lieut. Maury.

JANUARY 14—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
B²	2 55 26.0	38.632	+ 0 4.0	— 3.690	C.
B¹	55 30.0	(34.942)			
Star *c* . . .	2 56 22.5	43.150	— 0 52.5	— 8.208	
Star *e* . . .	3 1 24.0	22.023	— 5 54.0	+ 12.919	

Corr. of Chron. . . . . s. — 6.8.

	h. m. s.	° ′ ″
Star *c*	23 59 15.63	— 0 31 0.12

	Sid. time. h. m. s.	m. s.	′ ″
B¹—Star *c* . . .	2 29 26.2	—0 54.82	—2 10.55
Δ *ρ* . . .		— .02	— .07
B¹—Star *d* . . .	2 21 5.8	—5 57.82	+1 30.76
Δ *ρ* . . .		+ .01	+ .04
B¹—Star *e* . . .	2 55 23.2	—5 54.00	+3 19.03
Δ *ρ* . . .		+ .02	+ .08
B²—B¹ . . .	2 27 57.3	—0 4.00	+1 9.03
		.00	+ :04

There is discordance in the micrometer readings of Jan. 12, 13 and 14. The zero of the scale corresponding to 0.65 *div.* on the mic. head, the discrepancy may be removed by adding 1*r.* to the recorded mic. readings which are less than .65 for Lieutenant Maury's observations, and to all of Professor Coffin's, as would be required by the different mode of reading of the two observers. The readings here printed have been thus corrected.

JANUARY 18.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*	Comet—Star. Δ mic.	Observer.
B²	2 22 57.5	32.626	+ 0 5.5	+ 7.669	M.
B¹	23 3.0	(40.295)			
Star *f* . . .	23 34.0	30.355	— 0 31.0	+ 9.940	
Star *g* . . .	25 11.0	17.142	— 2 8.0	+ 23.153	
B²	30 9.0	32.334	+ 0 4.5	+ 7.961	
B¹	30 13.5	(40.295)			
Star *f* . . .	30 45.5	30.570	— 0 32.0	+ 9.725	
Star *h* . . .	33 44.6	48.020	— 3 31.1	— 7.725	
B²	37 37.0	33.446	+ 0 5.0	+ 6.849	
B¹	37 42.0	(40.295)			
Star *f* . . .	38 11.8	31.490	— 0 29.8	+ 8.805	
Star *h* . . .	41 11.2	49.052	— 3 29.2	— 8.757	
B²	46 11.5	33.180	+ 0 4.7	+ 7.115	
B¹	46 16.2	(40.295)			
Star *f* . . .	46 45.0	30.682	— 0 28.8	+ 9.613	
Star *h* . . .	2 49 44.6	48.138	— 3 28.4	— 7.843	

* Recorded 52*r*.432.   † Recorded 323°49′.

JANUARY 18—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*	Comet—Star. Δ mic.
	h. m. s.	*Revs.*	m. s.	*Revs.*
B²	4 6 32.0	33.662	+ 0 4.0	+ 6.633
B¹	6 36.0	(40.295)		
Star *f* . . .	6 54.5	30.205	— 0 18.5	+ 10.090
Star *h* . . .	4 9 53.2	47.432*	— 3 17.2	— 7.137

Observation of angle of position of B² and B¹:

	h. m. s.	Verniers of Pos. Circle. I. ° ′	Verniers of Pos. Circle. II. ° ′
Star runs along mic wire .	. . .	92 25	272 33
Mic. wire joins B² and B¹ at	2 53 30	143 46	323 54
	2 57 00	144 38	324 49†
	3 1 30	146 38	326 46

Corr. of Chron. . . . . s. — 22.4.

	h. m. s.	° ′ ″
Star *h*	0 13 58.35	— 0 51 31.

		Sid. time. h. m. s.	m. s.	′ ″
B¹—Star *f*	1st series .	2 33 56.3	—0 30.40	—2 26.
Δ *ρ*			.00	— .
B¹—Star *f* .	2d series .	4 6 13.6	—0 18.50	—2 35.
Δ *ρ*			— .01	— .
B¹—Star *g*	. . .	2 24 48.6	—2 8.00	—5 56.
Δ *ρ*			.00	— .
B¹—Star *h*	1st series .	2 37 41.5	—3 29.57	+2 4.
Δ *ρ*			.00	+ .
B¹—Star *h*	2d series .	4 6 13.6	—3 17.20	+1 49.
Δ *ρ*			.00	+ .
B²—B¹	1st series .	2 33 56.3	—0 4.92	—1 53.
Δ *ρ*			.00	— .
B²—B¹	2d series .	4 6 13.6	—0 4.00	—1 42.
Δ *ρ* . .			.00	— .

Night clear and cold: observations better than on the previous dates. tail of B¹ only a few minutes of arc, extending towards the N. E.; that not so long, and nearly parallel with the first. Nuclei decided, not as d points, but rather as though several nuclei were grouped together about

JANUARY 19.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*	Comet—Star. Δ mic.
B²	2 9 48.0	33.165	+ 0 4.0	+ 7.13
B¹	9 52.0	(40.295)		
Star *h* . . .	10 17.2	32.272	— 0 25.2	+ 8.02
Star *i* . . .	15 2.4	42.728	— 5 10.4	— 2.43
B²	18 39.0‡	33.162	+ 0 4.0	+ 7.13
B¹	18 43.0	(40.295)		
Star *h* . . .	19 7.5	32.644	— 0 24.5	+ 7.651
Star *i* . . .	2 23 52.8	42.712	— 5 9.8	— 2.417

‡ Recorded 29*s*.0.

JANUARY 19—continued.

bject.	Chron. times of transit.	Mic. readings.	Comet—Star.		Observer.
			Δ a	Δ mic.	
	h. m. s.	*Revs.*	m. s.	*Revs.*	
. . .	2 26 31.5	33.560	+ 0 4.5	+ 6.735	M.
. . .	26 36.0	(40.295)			
. . .	26 59.5	32.398	— 0 23.5	+ 7.897	
. . .	31 44.6	42.642	— 5 8.6	— 2.347	
. . .	35 6.0	33.725	+ 0 4.0	+ 6.570	
. . .	35 10.0	(40.295)			
. . .	35 33.0	32.198	— 0 23.0	+ 8.097	
. . .	40 18.6	42.384	— 5 8.6	— 2.089	
. . .	52 40.0	33.501	+ 0 4.5	+ 6.794	C.
. . .	52 44.5	(40.295)			
. . .	52 4.0	32.153	— 0 19.5	+ 8.142	
. . .	57 49.3	42.277	— 5 4.8	— 1.982	
. . .	3 1 40.0	33.271†	+ 0 5.0	+ 7.024	
. . .	1 45.0	(40.295)			
. . .	2 3.8	31.933	— 0 18.8	+ 8.362	
. . .	3 6 49.0	42.255	— 5 4.0	— 1.960	

† Recorded 32*r*.271.

Observation of position and distance of B² and B¹ :

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
r runs along mic. wire . .		92 29	
ansit wire joining B² and B¹ at .	3 11 50	54 24	33.000

Corr. of Chron. . . — 27.9 s.

	h. m. s.	° ′ ″
r *h*	0 13 58.34	— 0 51 31.22
r *i*	0 18 43.99	— 0 54 9.55

	Sid. time. h. m. s.		m. s.		′ ″
—Star *h* .	2 33 40.5	—	0 22.42	+	2 3.69
. . . .			.00		.07
—Star *i* . .	2 33 40.5	—	5 7.70	—	0 33.97
. . . .			.00		.00
—B¹ . .	2 33 40.5	—	0 4.33	+	1 46.26
. . . .			.00	+	.06

Not a favorable night for observation.

JANUARY 22.

. . .	2 49 31.2	51.270	+ 1 23.8	— 10.976	M.
. . .	50 49.0	32.796	+ 0 6.0	+ 7.498	
. . .	50 55.0	(40.294)			
. . .	53 20.5*	57.434	— 2 25.5	— 17.140	
. . .	57 17.5†	51.945	— 6 22.5	— 11.651	
. . .	3 2 42.0		+ 0 5.4		
. . .	2 47.4				
. . .	5 4.8	51.328	+ 1 25.2	— 11.034	
. . .	6 25.0	33.380	+ 0 5.0	+ 6.914	
. . .	6 30.0	(40.294)			
. . .	8 56.2	57.833	— 2 26.2	— 17.539	
. . .	10 48.0	70.940	— 4 18.0	— 30.646	
. . .	3 12 49.4	51.262	— 6 19.4	— 10.968	

* Recorded 30*s*.5. † Recorded 37*s*.5.

JANUARY 22—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star.		Observer.
			Δ a	Δ mic.	
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star *j* . . .	3 16 6.0	50.798	+ 1 27.0	— 10.504	M.
B²	17 27.4	32.640	+ 0 5.6	+ 7.654	
B¹	17 33.0	(40.294)			
Star *k* . . .	19 57.8	57.472	— 2 24.8	— 17.178	
Star *n* . . .	21 13.0	67.750	— 3 40.0	— 27.456	
Star *m* . . .	21 50.0	70.994	— 4 17.0	— 30.700	
Star *l* . . .	23 51.0	51.232‡	— 6 18.0	— 10.938	
Star *j* . . .	27 3.5	50.886	+ 1 29.0	— 9.592	
B²	28 27.0	32.882	+ 0 5.5	+ 7.412	
B¹	3 28 32.5	(40.294)			

‡ Recorded 50*r*.232.

Observation of position and distance of B² and B¹ :

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
Star runs along mic. wire . .		92 35	
Transit wire joining B² and B¹ at .	3 41 0	56 53	30.684
	3 42 0	57 55	30.684

Corr. of Chron. . . — 40.1 s.

	h. m. s.	° ′ ″
Star *j*	0 21 58.03	— 1 10 24.19

	Sid. time. h. m. s.		m. s.		′ ″
B¹—Star *j* . .	3 10 12.5	+	1 26.25	+	2 42.17
Δ ρ . . .			.00	+	.10
B¹—Star *k* . .	3 4 19.2	—	2 25.50	+	4 26.31
Δ ρ . . .		+	.01	+	.17
B¹—Star *l* . .	3 4 19.2	—	6 19.97	+	2 52.32
Δ ρ . . .			.00	+	.10
B¹—Star *m* . .	3 11 21.4	—	4 17.50	—	7 52.54
Δ ρ . . .			.01	+	.30
B¹—Star *n* . .	3 20 32.9	—	3 40.00	+	7 2.99
Δ ρ . . .		+	.08	+	.27
B²—B¹ . .	3 8 35.5	—	0 5.50	+	1 53.53
Δ ρ . . .			.00	+	.07

Ground covered with snow. Windy and clear. Observations good.

JANUARY 23.

Star *o* . . .	2 39 57.5	60.970	+ 1 42.7	— 20.651	M.
Star *k* . . .	40 50.6	38.942	+ 0 49.6	+ 1.377	
B²	41 35.0	32.760	+ 0 5.2	+ 7.559	
B¹	41 40.2	(40.319)			
Star *p* . . .	42 40.0		— 0 59.8		
Star *q* . . .	45 13.2	73.844	— 3 33.0	— 33.525	
Star *o* . . .	48 46.0	60.952	+ 1 45.0	— 20.633	
Star *k* . . .	49 39.4	39.045	+ 0 51.6	+ 1.274	
B²	50 26.0	32.900	+ 0 5.0	+ 7.419	
B¹	50 31.0	(40.319)			
Star *p* . . .	51 29.0	74.230	— 0 58.0	— 33.911	
Star *q* . . .	54 2.7	73.845	— 3 31.7	— 33.526	
Star *o* . . .	57 8.5	60.356	+ 1 45.3	— 20.037	
Star *k* . . .	58 2.0	38.250	+ 0 51.8	+ 2.069	
B²	58 49.0	32.440	+ 0 4.8	+ 7.879	
B¹	58 53.8	(40.319)			
Star *p* . . .	2 59 51.0	73.610	— 0 57.2	— 33.291	
Star *q* . . .	3 2 24.8	73.310	— 3 31.0	— 32.991	
Star *o* . . .	5 25.0	59.760	+ 1 45.0	— 19.441	
Star *k* . . .	6 18.2	37.916	+ 0 51.8	+ 2.403	
B²	7 6.0	31.860	+ 0 4.0	+ 8.459	
B¹	7 10.0	(40.319)			
Star *p* . . .	8 7.0	72.992	— 0 57.0	— 32.673	
Star *q* . . .	3 10 40.8	72.698	— 3 30.8	— 32.379	

FEBRUARY 4.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
B^2	3 28 30.0	27.783	+ 0 6.5	+ 12.204	*W.
B^1	28 36.5	(39.987)			
B^2	30 31.5	27.577	0 6.0	12.410	
B^1	30 37.5	(39.987)			
B^2	32 51.0	27.578	0 6.0	12.409	
B^1	32 57.0	(39.987)			
B^2	33 51.0	27.462	+ 0 6.5	+ 12.525	
B^1	3 33 57.5	(39.987)			

Observation of position and distance of B^2 and B^1:

	h. m. s.	Pos. Vernier. ° '	Mic. *Revs.*
Star runs along mic. wire . .		92 36	
Transit wire joining B^2 and B^1 .	3 37 0	65 45	26.015†
	3 42 0	65 47	25.926‡

Star y	3 55 1.5	(55.151)	+ 7 28.0	— 52.490	
Star z	56 38.0		5 51.5		
Star a	57 7.5		+ 5 22.0		
B^1	4 2 29.5	2.661			

Corr. of Chron. . . . m. s. — 1 33.7.

	h. m. s.	° ' "
Star y	1 3 24.24	— 2 48 25.98
Star a	1 5 30.71	

	Sid. time. h. m. s.	m. s.	' "
B^1—Star y . .	4 0 55.8	+ 7 28.00	+ 13 28.66
Δ ρ . . .		+ .02	+ .56
B^1—Star z . .	4 0 55.8	+ 5 51.50	
Δ ρ . . .		— .01	
B^1—Star a . .	4 0 55.8	+ 5 22.00	
Δ ρ . . .		— .01	
B^2—B^1 . . .	3 29 58.4	— 0 6.25	+ 3 10.84
Δ ρ . . .		.00	+ .13

Decided stellar nucleus to each Comet. The tails of the two Comets reached nearly across the field, and are nearly parallel, and the two Comets themselves are of nearly equal intensity of light.

FEBRUARY 5.

Star b	3 49 2.0	(40.035)	+ 0 54.0	+ 17.920	M.
Star c	49 24.8	63.290	+ 0 31.2	— 5.335	
B^2	49 49.5		+ 0 6.5		
B^1	49 56.0	57.955			
Star b	52 56.0	(40.035)	+ 0 54.0	+ 17.405	
Star c	53 19.0	63.520	+ 0 31.0	— 6.080	
B^2	53 44.0		+ 0 6.0		
B^1	3 53 50.0	57.440			

*Mr. Walker.

† Recorded 25r.015. ‡ Recorded 24r.926.

FEBRUARY 5—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α.	Comet—Star. Δ mic.
	h. m. s.	*Revs.*	m. s.	*Revs.*
Star b	3 56 21.4	(40.035)	+ 0 55.6	+ 17.45
Star c	56 44.2	63.565	+ 0 32.8	+ 6.07
B^2	57 9.5		+ 0 7.5	
B^1	57 17.0	57.486		
B^2	59 35.5	53.080*	+ 0 6.0	— 13.04
B^1	59 41.5	(40.035)		
B^2	4 0 48.5	53.036	+ 0 7.5	— 13.09
B^1	0 56.0	(40.035)		
B^2	2 17.0	53.070	+ 0 6.4	— 13.03
B^1	2 23.4	(40.035)		
B^2	5 7.0	53.098	+ 0 7.5	— 13.06
B^1	5 14.5	(40.035)		
B^2	14 39.5	52.975	+ 0 5.5	— 12.94
B^1	14 45.5	(40.035)		
B^2	19 54.0	53.364	+ 0 5.2	— 13.32
B^1	19 59.2	(40.035)		
B^2	21 33.8	53.473	+ 0 7.2	— 13.43
B^1	4 21 41.0	(40.035		

Observation of position and distance of B^2 and B^1 :

	h. m. s.	Pos. Venier. ° '	Mi Re
Star runs along mic. wire . .	. .	92 23	
Transit wire joining B^2 and B^1 .	4 27 0	68 1	54.5

Corr. of Chron. . . . . m. s. — 1 38.2.

	h. m. s.	° ' '
Star b	1 13 58.80	—2 48 20.

	Sid. time. h. m. s.	m. s.	' '
B^1—Star b . .	3 52 2.8	+ 0 54.53	+ 4 31
Δ ρ . . .			
B^1—Star c . .	3 52 2.8	+ 0 31.67	— 1 29
Δ ρ . . .			
B^2—B^1 . .	4 2 56.2	— 0 6.53	+ 3 22

Observations difficult. Comets dim in haze.

FEBRUARY 9.

B^2	4 1 19.4		+ 0 7.1	
B^1	1 26.5	14.145		
Star d	1 35.4	(39.988)	— 0 8.9	— 25.8
Star e	2 44.4	16.712	— 1 17.9	— 2.5
B^2	4 35.5		+ 0 7.1	
B^1	4 4 42.6			

*Recorded 54.080.

FEBRUARY 9—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	M.
. . . .	4 6 29.5		+ 0 7.7		
. . . .	6 37.2				
d . . .	6 45.1		— 0 7.9		
. . . .	11 0.7		+ 0 6.3		
. . . .	11 7.0	13.642			
d . . .	11 15.2	(39.988)	— 0 8.2	— 26.346	
e . . .	12 23.6	16.650	— 1 16.6	— 3.008	
. . . .	13 38.1		+ 0 7.7		
. . . .	13 45.8	13.310			
e . . .	15 1.6	16.688	-- 1 15.8	— 3.378	
. . . .	16 16.4		+ 7.2		
. . . .	16 23.6	13.478			
d . . .	16 30.0	(39.988)	— 6.4	— 26.510	
e . . .	17 39.1	16.581	— 1 15.5	— 3.103	
. . . .	20 30	(39.988)		— 15.676	
. . . .		24.312			
. . . .	21 45	(39.988)		— 15.754	
. . . .		24.234			
. . . .	22 42	(39.988)		—.15.738	
. . . .		24.250			
. . . .	23 27.9		+ 0 7.7		
. . . .	23 35.6*				
. . . .	24 14.4		+ 0 7.7		
. . . .	24 22.1				
. . . .	25 42.8		+ 0 7.7		
. . . .	25 50.0				
d . . .	25 54.7		— 0 4.7		
. . . .	26 25.3		+ 0 8.2		
. . . .	26 33.5				
d . . .	4 26 37.4		— 0 3.9		

Observation of position and distance of B² and B¹:

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
Mic. wire joining B² and B¹ . .	4 29 0	335 43	
	4 30 50	335 41	
ransit wire	4 35 31		57.075
	4 37 36		56.972
	4 50 10	65 24	57.414

Corr. of Chron. . . — 1 m. 55.7 s.

	h. m. s.	° ′ ″
tar d	1 31 49.86	— 3 18 18.25
tar e	1 32 58.23	— 3 24 10.18

	Sid time. h. m. s.	m. s.	′ ″
B¹—Star d . .	4 6 57.9	— 0 7.67	— 6 44.15
ρ		— .01	— .27
¹—Star e . .	4 8 45.0	— 1 16.45	— 0 46.43
ρ		.00	— .03
²—B¹ . . .	4 13 2.4	— 0 7.44	+ 4 2.23
ρ		.00	+ .16

ery bright moonlight. Observations difficult, B² has the greatest in-ity with two-thirds the light of B¹.

* Recorded 45s.6.

FEBRUARY 11.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	M.
B²	5 8 45.5		+ 0 7.7		
B¹	8 53.2				
B²	14 25.0		+ 0 7.6		
B¹	14 32.6				
B²	14 48.0		+ 0 8.0		
B¹	14 56.0				
B²	19 42	55.540		— 15.505	
B¹		(40.035)			
B²	20 36	55.436		— 15.401	
B²	23 6	56.028		— 15.993	
B²	26 0	55.782		— 15.747	
Star f . . .	28 44.8	(40.035)	+ 0 59.8	— 29.753	
B²	29 37.2	25.828	+ 0 7.4	— 15.546	
B¹	29 44.6	10.282			
Star f . . .	32 42.4	(40.035)	+ 1 1.1	— 30.577	
B²	33 35.8	26.360	+ 0 7.7	— 16.902	
B¹	33 43.5	9.458			
Star f . . .	36 17.0	(40.035)	+ 1 1.0	— 30.083	
B²	37 10.0	25.878	+ 0 8.0	— 15.926	
B¹	5 37 18.0	9.952			

Observation of position and distance of B² and B¹:

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
Star runs along mic. wire . .		92 32	
Mic. wire joining B² and B¹ .	5 43 0	155 10	
	45 0	155 22	
Transit wire . . .	6 2 0	66 47	58.956

Corr. of Chron. — 2 m. 5.5 s.

	h. m. s.	° ′ ″
Star f	1 39 44.44	— 3 40 51.37

	Sid time. h. m. s.	m. s.	′ ″
B¹—Star f . .	5 31 29.9	+ 1 0.63	— 7 44.30
Δ ρ . . .		— .01	— .40
B²—B¹. . .	5 21 5.8	— 0 7.73	+ 4 4.34
Δ ρ . . .		+ .01	+ .26

The nucleus of B² decidedly stellar; that of B¹ diffused, and by no means as bright.

FEBRUARY 12.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*.	Comet—Star. Δ mic.	Observer.
Star g . . .	4 9 45.0	69.932	+ 5 38.4	— 10.382	M.
Star h . . .	10 20.9	(40.140)	+ 5 2.5	+ 19.410	
B²	15 23.4	59.550			
Star i . . .		71.376		— 11.826	
B¹	15 31.6		— 0 7.2		
B²	22 55.7	28.470			
Star i . . .	4 22 59.4	40.140	— 0 3.7	— 11.670	

FEBRUARY 12—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ a.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
B^2	4 25 5.9	28.390			M.
Star i . . .	25 9.1	(40.140)	— 0 3.2	— 11.750	
B^2	27 33.5	27.744			
Star i . . .	27 35.2	(40.140)	— 0 1.7	— 12.396	
B^2	28 53.2	27.630			
Star i . . .	28 55.9	(40.140)	— 0 2.7	— 12.510	
B^2	32 54.9	(40.140)			
B^1	33 2.5	23.150	— 0 7.6	+ 16.990	
B^2	34 45.7	(40.140)			
B^1	34 53.4*	22.405	— 0 7.7	+ 17.735	
B^2	35 59.8	(40.140)			
B^1	36 8.3	22.400	— 0 8.5	+ 17.740	
B^2	36 59.0	(40.140)			
B^1	4 37 7.2	22.400	— 0 8.2	+ 17.740	

Observation of position and distance of B^2 and B^1:

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
Star runs along mic. wire .		272 30	
Mic. wire joining B^2 and B^1 .	4 42 30	335 52	
	44 40	337 12	
	45 40	336 30	
Transit wire . . .	49 50		58.340
	50 45		58.245

Corr. of Chron. . . m. s. — 0 52.4.

	Sid. time. h. m. s.	h. m. s. / m. s.	° ′ ″
Star g		1 39 16.11	— 3 53 14.45
h		1 39 51.11	4 0 51.58
i		1 44 59.47	— 3 52 51.23
B^2—Star g .	4 14 31.0	+ 5 38.40	— 2 39.94
Δ ρ . .		.00	— .11
B^2—Star h .	4 14 31.0	+ 5 2,50	+ 4 59.03
Δ ρ . .		+ .01	+ .20
$Δ^2$—Star i .	4 23 5.9	— 0 2.82	— 3 5.34
B ρ . .		.00	— .13
B^2—B^1 . .	4 34 17.4	— 0 8.00	+ 4 30.39
Δ ρ . .		+ .01	+ .18

B^1 has the largest mass of light; caught glimpses of two nuclei in it. Its tail reaches full one-third across the field. B^2 has a more fiery tail nearly parallel with that of B^1—could see by glimpses another extending towards B^1 in a sort of arch. Also decided appearance of two tails to B^1, the second going off in a direction opposite to B^2.

FEBRUARY 13.

Observation of position and distance of B^2 and B^1:

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
Star runs along mic. wire .		272 30	
Transit wire joining B^2 and B^1	4 26 0	66 40	59.928
	30 0	65 52	59.942

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ a.	Comet—Star. Δ mic.	Observer.
B^2	4 44 11.5	58.244			W.
B^1	44 19.8	(40.000)	— 0 8.3	+ 18.244	
Star j . . .	4 47 5.1	64.809	— 2 53.6	— 6.565	

* Recorded 43.4.

FEBRUARY 13—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ a.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
B^2	4 49 32.5	57.814			W.
B^1	49 41.5	(40.000)	— 0 9.0	+ 17.814	
Star j . . .	52 26.0	64.180	— 2 53.5	— 6.366	
B^2	55 17.0	58.118			
B^1	55 25.7	(40.000)	— 0 8.7	+ 18.118	
Star j . . .	4 58 9.0	64.664	— 2 52.0	— 6.546	

Corr. of Chron. . . m. s. — 0 55.9.

	Sid. time. h. m. s.	h. m. s. / m. s.	° ′ ″
Star j		1 52 29.09	— 4 7 5.51
B^2—Star j .	4 51 37.5	— 2 53.03	— 1 40.01
Δ ρ . .		.00	— .08
B^2—B^1 . .	4 51 37.5	— 0 8.67	+ 4 38.22
Δ ρ . .		.00	+ .21

FEBRUARY 16.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ a.	Comet—Star. Δ mic.	Observer.
Star k . . .	4 29 30.2	(39.964)	+ 4 31.3	+ 32.181	M.
B^2	34 1.5	72.145			
B^1	34 11.5		— 0 10.0		
Star k . . .	37 34.8	(39.964)	+ 4 33.0	+ 32.164	
B^2	42 7.8	72.128			
B^1	42 17.2		— 0 9.4		
Star k . . .	44 40.5	(39.964)	— 4 32.9	+ 32.166	
B^2	49 13.4	72.130			
B^1	49 23.5		— 0 10.1		
Star l . . .	53 33.8	72.868	— 4 20.4	— 0.738	
Star m . . .	55 52.8	72.690	— 6 39.4	— 0.560	
Star n . . .	56 56.5	66.454	— 7 43.1	+ 5.676	
Star o . . .	58 32.8	73.765	— 9 19.4	— 1.635	
B^2	5 1 54.0				
B^1	2 3.8		— 0 9.8		
B^2	2 55.8				
B^1	3 5.4		— 0 9.6		
B^2	3 47.0				
B^1	3 56.8		— 0 9.8		
B^2	4 30.0				
B^1	4 39.8		— 0 9.8		
B^2	5 25.4				
B^1	5 35.0		— 0 9.6		
B^2	8 16.8	(39.964)			
B^1	8 25.7	20.222	— 0 8.9	+ 19.742	
B^2	11 42.8	(39.964)			
B^1	11 52.5	20.110	— 0 9.7	+ 19.854	
B^2	5 13 30	(39.964)			
B^1		20.147		+ 19.817	

FEBRUARY 16—continued.

ct.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
. .	5 15 58.4	(39.964)			M.
. .	16 8.3	20.150	— 0 8.9	+ 19.814	
. .	17 38.8	(39.964)			
. .	5 17 48.7	20.126	— 0 9.9	+ 19.838	

Observation of position and distance of B^2 and B^1:

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
ans along mic. wire		272 35	
	5 22 5		18.328
	26 15		17.685
	30 15		17.590
	32 10		17.740
wire joining B^2 and B^1	34 27	334 32	
	37 18	335 20	
	38 10	335 0	

Corr. of Chron. . . . m. s. — 1 6.2.

	h. m. s.	° ′ ″
. . . . .	1 59 18.41	— 4 57 16.61
. . . . .	2 8 12.02	4 48 48.46
. . . . .	2 10 31.26	— 4 48 51.87

	Sid. time. h. m. s.	m. s.	′ ″
tar k .	4 40 41.4	+ 4 32.40	+ 8 15.61
. .		+ .01	+ .35
tar l .	4 48 7.2	— 4 20.40	— 0 11.37
. .		.00	.00
tar m .	4 48 7.2	— 6 39.40	— 0 8.78
. .		.00	.00
tar n .	4 48 7.2	— 7 43.10	+ 1 27.44
. .		.00	+ .05
tar o .	4 48 7.2	— 9 19.40	— 0 25.19
. .		.00	.00
. .	5 5 21.4	— 0 9.62	
	5 12 19.2	+ .01	+ 5 5.24
. .			+ .21

evening twilight B^2 became visible the first, having one-third more B^1. Perceived a diamond-like nucleus.

FEBRUARY 18.

. .	4 37 46.0	(39.970)	+ 0 23.0	— 10.835	M.
. .	38 9.0	29.135			
. .	39 42.8	(39.970)	+ 0 24.2	— 10.818	
. .	40 7.0*	29.152			
. .	41 36.8	(39.970)	+ 0 24.2	— 10.806	
. .	42 1.0	29.164			
. .	43 37.8	(39.970)	+ 0 23.0	— 10.792	
. .	44 0.8	29.178			
. .	47 26.0	16.590	— 3 25.2	+ 12.588	
. .	50 37.7	(39.970)	+ 0 24.9	— 11.032	
. .	51 2.6†	28.938			
. .	55 23.8	(39.970)	+ 0 26.4	— 11.380	
. .	55 50.2	28.590			
. .	4 59 12.1	16.545	— 3 21.9	+ 12.045	

* Recorded 2.0. † Recorded 52.6.

FEBRUARY 18—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star p . . .	5 1 24.6	(39.970)	+ 0 26.8	— 11.766	M.
B^1	1 51.4	28.204			
Star q . . .	5 12.4	16.570	— 3 21.0	— 11.634	
Star p . . .	7 14.2	(39.970)	+ 0 28.3	— 12.138	
B^1	7 42.5	27.832			
Star q . . .	11 1.8	16.518	— 3 19.3	+ 11.314	
Star p . . .	15 32.4		+ 0 31.5		
B^2	15 53.8				
B^1	16 3.9		— 0 10.1		
Star p . . .	16 38.0		+ 0 31.1		
B^2	16 59.2				
B^1	17 9.1		— 0 9.9		
Star p . . .	18 36.2		+ 0 30.2		
B^2	18 56.8				
B^1	19 6.4		— 0 9.6		
Star p . . .	19 53.4		+ 0 31.6		
B^2	20 15.0				
B^1	20 25.0		— 0 10.0		
B^2	28 48.2	60.518			
B^1	28 58.3	(39.970)	— 0 10.1	+ 20.548	
B^2	35 11.2	(39.970)			
B^1	35 21.4	19.424	— 0 10.2	+ 20.546	
B^2	41 19.8	60.695			
B^1	41 30.0	(39.970	— 0 10.2	+ 20.725	
B^2	49 6.0	(39.970)			
B^1	5 49 15.8	19.300	— 0 9.8	+ 20.670	

Observation of position and distance of B^2 and B^1:

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
Star runs along mic. wire		272 26	
	5 53 0		16.754
	54 50		16.692
	56 57		16.728
Mic. wire joining B^2 and B^1 .	6 0 24	157 51	
	2 26	156 25	
	4 3	155 30	
	5 44	155 15	
Transit.	30 0	247 25	16.382
	34 0	247 18	16.424
	35 0	247 51	
Mic.	39 0	157 30	
	41 0	156 32	
	42 0	157 18	
	45 0	156 46	

Corr. of Chron. m. s. — 1 11.8.

	h. m. s.	° ′ ″
Star q	2 17 24.82	— 5 26 54.97

	Sid time. h. m. s.	m. s.	′ ″
B^1—Star p . .	4 58 15.6		— 2 52.49
	4 48 53.8	+ 0 27.10	
Δ ρ . . .		.00	— .11
B^1—Star q . .	4 56 9.4	— 3 21.85	+ 3 3.25
Δ ρ . . .		.00	+ .12
B^2—B^1 . .	5 27 16.9	— 0 9.99	
	5 37 34.6		+ 5 17.70
Δ ρ . . .		+ .01	+ .21

B^2 half as bright again as B^1. The tails distinct and nearly parallel. Nucleus of B^1 bright and diamond-like, that of B^2 not so distinct as before.

February 21.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star r . . .	5 3 40.3	(39.970)	+ 3 22.5	+ 28.625	M.
Star s . . .	5 5.5		+ 1 57.3		
B¹	7 2.8	68.595			
Star r . . .	10 7.2	(39.970)	+ 3 24.4	+ 28.470	
Star s . . .	11 31.5*	32.562	+ 2 0.1	+ 35.878	
B²	13 18.4		+ 0 13.2		
B¹	13 31.6	68.440			
B²	19 34.2	62.928	+ 0 11.6	+ 22.958	
B¹	19 45.8	(39.970)			
B²	22 40.2	62.923	+ 0 11.2	+ 22.953	
B¹	22 51.4	(39.970)			
B²	26 25.8	63.032	+ 0 12.9	+ 23.062	
B¹	26 38.7	(39.970)			
B²	28 29.8		+ 0 11.6		
B¹	5 28 41.4				

Observation of position and distance of B² and B¹:

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
Star runs along mic. wire .		272 26	
Mic. wire joining B² and B¹ .	5 31 0	335 52	
	33 8	335 59	
	37 0		66.040
Transit	40 0	66 36	66.125
	44 0		66.152

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.
Star r . . .	5 52 14.4	(39.970)		
Star s . . .	53 39.8	32.630		
B²	55 35.0			
Star r . . .	59 58.0	(39.970)	+ 3 33.2	+ 26.235
B² † . . .	6 3 20.4		+ 0 10.8	
B¹ † . . .	3 31.2	66.205		
Star r . . .	6 43.5	(39.970)	+ 3 35.1	+ 26.110
Star s . . .	8 9.0	32.490	+ 2 9.6	+ 33.590
B²	10 7.5		+ 0 11.1	
B¹	6 10 18.6	66.080		

Corr. of Chron. . . . m. s. — 1 22.7.

	h. m. s.	° ′ ″
Star r	2 26 27.99	— 6 19 0.19
Star s	2 27 53.37	— 6 20 55.70

	Sid time. h. m. s.	m. s.	′ ″
B¹—Star r . .	5 37 13.3	+ 3 28.80	+ 7 1.51
Δ ρ . . .		+ .01	+ .35
B¹—Star s . .	5 28 55.0	+ 2 2.33	+ 8 55.11
Δ ρ . . .		+ .02	+ .44
B²—Star r . .	5 54 12.3	+ 3 20.60	
Δ ρ . . .		+ .02	
B²—Star s . .	5 54 12.3	+ 1 55.20	
Δ ρ . . .		+ .03	
B²—B¹ . .	5 33 40.0	— 0 11.77	
	5 21 42.6		+ 5 54.20
Δ ρ . . .		+ .01	+ .30

Observations of this evening very unsatisfactory.

* Recorded 12*m*. † Nearly obscured by clouds.

February 22.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.
	h. m. s.	*Revs.*	m. s.	*Revs.*
Star t . . .	4 48 37.3	(39.957)	+ 2 45.6	— 29.012
B²	51 11.4		+ 0 11.5	
B¹	51 22.9	10.945		
Star t . . .	5 8 41.9	(39.957)	+ 2 50.1	— 29.769
B²	11 20.2		+ 0 11.8	
B¹	11 32.0	10.188		
Star t . . .	13 26.2	(39.957)	+ 2 51.3	— 29.802
B²	16 5.7		+ 0 11.8	
B¹	16 17.5	10.155		
Star t . . .	17 28.8	(39.957)	+ 2 52.2	— 30.123
B²	20 8.5		+ 0 12.5	
B¹	20 21.0	9.834		
Star t . . .	21 54.8	(39.957)	+ 2 53.4	— 30.782
B²	24 35.6		+ 0 12.6	
B¹	24 48.2	9.175		
B²	29 34.2	63.562	+ 0 12.2	— 23.605
B¹	29 46.4	(39.957)		
B²	31 56.4	63.706	+ 0 11.8	— 23.749
B¹	32 8.2	(39.957)		
B²	34 35.4	63.528	+ 0 12.6	— 23.571
B¹	34 48.0	(39.957)		
B²	37 55.4		+ 0 12.4	
B¹	5 38 7.8			

Observation of position and distance of B² and B¹:

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
Star runs along mic. wire . .		92 28	
Transit wire joining B² and B¹ .	5 40 0	66 43	65.988
	43 0		66.365
	45 0		67.038
	48 0		67.274
	53 0		66.740
Mic.	58 30	154 53	

Corr. of Chron. . . . m. s. — 1 25.8.

	h. m. s.	° ′ ″
Star t	2 32 27.71	— 6 20 47.80

	Sid. time. h. m. s.	m. s.	′ ″
B¹—Star t . .	5 11 26.5	+ 2 50.52	— 7 40.60
Δ ρ . . .		— .01	— .38
B²—B¹ . .	5 20 42.2	— 0 12.13	
	5 30 48.4		+ 6 4.23
Δ ρ . . .		+ .01	+ .30

Comets found in twilight, B¹ the brightest; B² having the most inte light : a line of nebulous matter a little arched joins the two comets. La in the evening an appearance of a double nucleus to B¹ and a second inclined 120° to the first. An arch of cometary matter seems to join the nuclei.

February 26.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.
Star u . . .	5 26 36.0	(39.963)	+ 3 25.5	— 10.35
Star v . . .	27 28.8	9.316	+ 2 32.7	+ 20.2
B²	29 46.5		+ 0 15.0	
B¹	5 30 1.5	29.604		

February 26—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star u . . .	5 32 59.0	(39.963)		— 10.372	M.
Star v . . .	33 51.6	9.350		+ 20.241	
B^2	36 11.0				
B^1		29.591			
Star u . . .	42 43.2	(39.963)	+ 3 30.8	— 11.099	
Star v . . .	43 35.8	9.322	+ 2 38.2	+ 19.542	
B^2	45 58.2		+ 0 15.8		
B^1	46 14.0	28.864			
Star u . . .	48 30.4	(39.963)		— 11.181	
Star v . . .	49 22.6	9.265		+ 19.517	
B^2	50 46.2				
B^1		28.782			
B^2	6 1 21.8		+ 0 15.2		
B^1	1 37.0				
B^2	2 7.0		+ 0 14.8		
B^1	2 21.8				
B^2	3 6.0		+ 0 15.0		
B^1	3 21.0				
B^2	4 48.5		+ 0 15.1		
B^1	5 3.6				
B^2	5 29.5		+ 0 14.7		
B^1	5 44.2				
B^2	12 30.	66.780		— 26.817	
B^1		(39.963)			
B^2	16 47.5		+ 0 14.5		
B^1	17 2.0				
B^2	18 20.0		+ 0 14.0		
B^1	18 34.0				
. . . .	19 7.0		+ 0 14.5		
. . . .	19 21.5				
. . . .		(39.963)		— 26.623	
. . . .	21 0.	13.340			
. . . .	25 0.	66.870		— 26.907	
. . . .		(39.963)			
. . . .	30 56.4	(39.963)	+ 0 14.8	— 26.033	
. . . .	6 31 11.2	13.930			

Observation of position and distance of B^2 and B^1:

	h. m. s.	Pos. Vernier. ° ′	Mic. *Revs.*
tar runs along mic. wire		92 24	
	6 36 0		9.930*
	6 41 0		70.184
	6 45 0		10.050
ic. wire joining B^2 and B^1	6 48 0	153 14	
	6 50 0	154 24	
	6 53 0	154 23	

Corr. of Chron. . . . m. s. — 1 38.4.

	Sid. time. h. m. s.	m. s.	′ ″
^{1}—Star u .	5 36 29.3	+ 3 28.15	
	39 17.2		— 2 45.66
ρ . .		.00	— .14
^{1}—Star v .	36 29.3	+ 2 35.45	
	39 17.2		+ 5 6.53
ρ . .		+ .01	+ .25
^{2}—B^1 . .	6 3 53.6	— 0 14.85	
	20 46.8		+ 6 49.72
ρ . .		+ .01	+ .34

n the early twilight B^1 was judged to be twice as large, and having two-ls the intensity of B^2. B^1 has a trifid tail, the one opposite to B^2 very nct. General character of observations good.

*Fixed wire álternately on B^1 and B^2.

March 3.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star w . . .	7 25 31.8	(39.952)	+ 5 44.2	— 33.348	M.
Star x . . .	28 13.8		+ 3 2.2		
Star y . . .	28 55.0	25.150	+ 2 21.0	— 18.546	
B^2	30 56.4		+ 0 19.6		
B^1	31 16.0	6.604			
Star w . . .	34 19.9*	(39.952)	+ 5 47.1	— 33.574	
Star x . . .	37 2.5	50.088	+ 3 4.5	— 43.710	
B^2	39 48.0		+ 0 19.0		
B^1	40 7.0	6.378			
B^2	42 35.4		+ 0 19.5		
B^1	42 54.9				
B^2	43 8.8		+ 0 19.8		
B^1	43 28.6				
B^2	43 39.6		+ 0 19.7		
B^1	43 59.3				
B^2	45 33.	69.470		— 29.518	
B^1		(39.952)			
B^2	47 19.	69.510		— 29.558	
B^1		(39.952)			
B^2	7 47 50.	69.555		— 29.603	
B^1		(39.952)			

Corr. of Chron. . . . m. s. — 1 56.6.

Star w . . . . . h. m. s. 3 24 55.94 ° ′ ″ —9 7 19.75

	Sid. time. h. m. s.	m. s.	′ ″
B^1—Star w .	7 33 44.9	+ 5 45.65	— 8 35.50
Δ ρ . . .		— .06	— .86
B^1—Star x .	33 44.9	+ 3 3.35	
	38 10.4		—11 13.40
Δ ρ . . .		— .08	— 1.12
B^1—Star y .	29 19.4	+ 2 21.00	— 4 45.72
Δ ρ . . .		— .03	— .48
B^2—B^1 . .	38 24.6	— 0 19.52	
	44 57.4		+ 7 35.40
Δ ρ . . .		+ .05	+ .76

B^1 at least six times as bright as B^2.

March 4.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
Star z . . .	7 34 41.4		+ 0 45.6		M.
B^2	35 7.0		+ 0 20.0		
B^1	35 27.0	(39.982)			
Star α . . .	35 36.0	55.930	— 0 9.0	— 15.948	
Star β . . .	36 16.8		— 0 49.8		
Star z . . .	37 48.5		+ 0 46.5		
B^1	38 35.0	(39.982)			
Star β . . .	39 24.5	61.480	— 0 49.5	— 21.498	
B^2	43 18.4		+ 0 20.4		
B^1	43 38.8				
B^2	44 37.2		+ 0 20.8		
B^1	44 58.0				
B^2	45 34.5		+ 0 21.7		
B^1	7 45 56.2				

*Recorded 9.9.

MARCH 4—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
B^2	7 48 0.	71.852		— 31.870	M.
B^1		(39.982)			
B^1	56 36.0				
Star α . . .	56 38.5		— 0 2.5		
B^1	59 11.0	23.780			
Star α . . .	59 14.0	(39.982)	— 0 3.0	— 16.202	
Star β . . .	7 59 54.6	45.902	— 0 43.6	— 22.122	

Corr. of Chron. . . — 2 0.5. (m. s.)

	h. m. s.	° ′ ″
Star α	3 37 50.75	— 9 31 17.90
Star β	3 38 32.14	— 9 29 46.26

	Sid. time. h. m. s.	m. s.	′ ″
B^1—Star z .	7 34 14.4	+ 0 46.05	
Δ ρ . . .			
B^1—Star α .	48 24.2	— 0 4.67	
	45 20.0		— 4 7.66
Δ ρ . . .		— .03	— .45
B^1—Star β .	42 23.8	— 0 47.63	
	46 52.5		— 5 36.01
Δ ρ . . .		— .04	— .62
B^2—B^1 . .	40 29.5	— 0 20.72	
	47 59.5		+ 8 10.99
Δ ρ . . .		+ .06	+ .90

Observations unsatisfactory. B² almost too faint for even tolerable observations.

MARCH 5.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
Star γ . . .	7 9 50.2	(39.958)	+ 2 20.0	+ 7.870	M.
B^2	11 47.6		+ 0 22.6		
B^1	12 10.2	47.828			
Star δ . . .	14 49.0	30.402	— 2 38.8	+ 17.426	
Star γ . . .	16 22.0	(39.958)	+ 2 22.2	+ 7.242	
B^1	18 44.2	47.200			
Star δ . . .	21 21.4	30.418	— 2 37.2	+ 16.782	
B^2	25 27.4		+ 0 23.1		
B^1	25 50.5				
B^2	26 19.5		+ 0 21.9		
B^1	26 41.4				
B^2	28 0.	71.668		— 31.710	
B^1		(39.958)			
B^2	7 30 0.	71.545		— 31.587	
B^1		(39.958)			

Corr. of Chron. . . — 2 4.7. (m. s.)

	h. m. s.	° ′ ″
Star δ	3 47 12.78	9 58 51.68

	Sid. time. h. m. s.	m. s.	′ ″
B^1—Star γ .	7 13 22.5	+ 2 21.10	+ 1 56.41
Δ ρ . . .		+ .01	+ .10
B^1—Star δ .	7 13 22.5	— 2 38.00	— 4 23.51
Δ ρ . . .		— .02	— .23
B^2—B^1 . .	7 19 29.3	— 0 22.53	
	28 55.3		+ 8 7.57
Δ ρ . . .		+ .03	+ .42

B² without any apparent nucleus or mark of condensation: exceedingly faint.

MARCH 8.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
B^2	7 10 50.5		+ 0 27.0		W.
Star ε . . .	11 8.3	(39.970)	+ 0 9.2	— 19.637	
B^1	11 17.5	20.333			
B^2	13 25.0		+ 0 26.1		
Star ε . . .	13 41.6	(39.970)	+ 0 9.5	— 19.586	
B^1	13 51.1	20.384			
B^2	15 10.8		+ 0 26.4		
Star ε . . .	15 26.6	(39.970)	+ 0 10.6	— 19.937	
B^1	15 37.2	20.033			
B^2	18 4.0		+ 0 26.6		
Star ε . . .	18 19.6	(39.970)	+ 0 11.0	— 19.642	
B^1	18 30.6	20.328			
			(B^2—Star.)	(B^2—Star.)	
B^2	21 9.9	53.473			
Star ε . . .	21 23.0	(39.970)	— 0 13.1	+ 13.503	
B^1	21 34.0		— 0 24.1		
B^2	23 1.9	53.581			
Star ε . . .	23 14.6	(39.970)	— 0 12.7	+ 13.611	
B^1	23 25.8		— 0 23.9		
B^2	26 50.6	53.245			
Star ε . . .	27 2.5	(39.970)	— 0 11.9	+ 13.275	
B^1	27 15.8		— 0 25.2		
Star ζ . . .	27 56.0	72.943	— 1 5.4	— 19.698	
B^2	30 38.3	(39.970)			
Star ε . . .	30 48.0		— 0 9.7		
B^1	31 2.0		— 0 23.7		
Star ζ . . .	31 41.2	59.582*	— 1 2.9	— 19.612	
B^2	36 4.8	53.130			
Star ε . . .	36 12.5	(39.970)	— 0 7.7	+ 13.160	
B^1	36 29.3		— 0 24.5		
Star ζ . . .	7 37 6.2	72.788	— 1 1.4	— 19.658	

Corr. of Chron. . . — 2 13.0. (m. s.)

	h. m. s.	° ′ ″
Star ε	4 6 11.25	— 10 47 8.13
ζ	4 7 5.13	— 10 38 46.03

	Sid. time. h. m. s.	m. s.	′ ″
B^1—Star ε . .	7 12 36.1	+ 0 10.08	— 5 3.50
Δ ρ . . .		— .02	— .38
B^2—Star ε . .	7 25 20.1	— 0 11.02	
	24 33.8		+ 3 26.23
Δ ρ . . .		+ .01	+ .25
B^2—Star ζ . .	7 28 58.2	— 1 3.23	— 5 2.81
Δ ρ . . .		— .02	— .38
B^2—B^1 . . .	7 19 54.0	— 0 25.28	
Δ ρ . . .		+ .03	

B² very faint, with a bright point near the center.

MARCH 10.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
B^2	7 29 36.0	53.986	— 0 24.0		W.
Star η . . .	30 0.0	(39.967)	— 0 28.5	+ 14.019	
B^1	7 30 4.5				

* Recorded 60r.582.

MARCH 10—continued.

bject.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ ρ	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
. . . .	7 33 21.2	53.902			W.
. . . .	33 44.5	(39.967)	— 0 23.3	+ 13.935	
. . . .	33 48.2		— 0 27.0		
. . . .	35 23.8	53.404			
. . . .	35 46.6	(39.967)	— 0 22.8	+ 13.437	
. . . .	35 50.2		— 0 26.4		
			(B^1—Star.)	(B^1—Star.)	
* . . .	43 4.8	(39.967)	+ 0 3.2	— 21.499	
. . . .	43 8.0	18.468			
. . . .	44 26.0	(39.967)	+ 0 7.3	— 21.073	
. . . .	44 33.3	18.894			
. . . .	45 8.0	(39.967)	+ 0 8.3	— 21.071	
. . . .	45 16.3	18.896			
. . . .	45 52.5	(39.967)	+ 0 8.0	— 21.583	
. . . .	46 0.5	18.384			
. . . .	59 0.5	(39.967)	+ 1 17.9	— 4.943	
. . . .	59 12.2		+ 1 6.2		
. . . .	8 0 6.8		+ 0 11.6		
. . . .	0 18.4	35.024			
. . . .	1 7.3	(39.967)	+ 1 18.7	— 5.239	
. . . .	1 18.8	28.528	+ 1 7.2	+ 6.200	
. . . .	2 13.0		+ 0 13.0		
. . . .	2 26.0	34.728			
. . . .	3 22.2	(39.967)	+ 1 20.5	— 5.579	
. . . .	3 33.8	28.224	+ 1 8.9	+ 6.164	
. . . .	4 28.8		+ 0 13.9		
. . .	4 42.7	34.388			
. . . .	6 9.8	(39.967)	+ 1 21.0		
. . .	6 21.3		+ 1 9.5		
. . . .	7 15.8	57.038	+ 0 15.0		
. . .	7 30.8				
. . . .	8 19.3	(39.967)	+ 1 21.8		
. . .	8 30.8		+ 1 10.3		
. . . .	9 25.5	57.122	+ 0 15.6		
. . .	9 41.1				
. . .	11 44.0	(39.967)	+ 0 17.0	— 22.717	
. . .	12 1.0	17.250			
. . .	13 11.2	(39.967)	+ 0 16.4	— 22.832	
. . .	13 27.6	17.135			
. . . .	14 20.0	(39.967)	+ 0 16.8	— 23.049	
. . .	8 14 36.8	16.918			

Corr. of Chron. . . m. s. — 2 19.3.

	h. m. s.	° ′ ″
ar η	4 21 38.68	— 11 24 11.19
ar ϑ	4 20 32.66	11 28 37.41
ar ι	4 20 43.96	— 11 31 31.49

	Sid. time. h. m. s.	m. s.	′ ″
—Star η .	7 30 27.7	— 0 23.37	+ 3 32.56
ρ . .		+ .01	+ .24
—Star η .	7 57 59.2	+ 0 12.17	
	54 41.2		— 5 38.55
ρ . .		— .03	.56
—Star ϑ .	8 2 36.5	+ 1 19.98	
	0 19.7		— 1 20.94
. .		.00	— .13
—Star ι .	8 2 36.5	+ 1 8.42	
	1 15.0		+ 1 35.24
. .		+ .01	+ .16
—B^1 . .	7 30 27.7	+ 0 27.30	
. .		+ .04	

* B^2 too faint for farther observation.

MARCH 14.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ ρ	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star κ . . .	7 25 48.4	(39.039)	+ 1 4.4	+ 32.571	M.
B^1	26 52.8	71.610			
Star κ . . .	28 40.0	(39.039)	+ 1 5.5	+ 32.601	
B^1	29 45.5	71.640			
Star κ . . .	31 27.2	(39.039)	+ 1 5.8	+ 32.491	
B^1	32 33.0	71.530			
Star κ . . .	36 46.3	(39.039)	+ 1 7.9	+ 32.626	
B^1	37 54.2	71.665			
Star κ . . .	39 30.8	(39.039)	+ 1 8.4	+ 32.506	
B^1	40 39.2	71.545			
B^2	48 12.4		+ 0 32.1		
B^1	48 44.5				
B^2	8 0 14.5		+ 0 33.7		
B^1	0 48.2				
B^2	1 29.0		+ 0 33.0		
B^1	2 2.0				
B^2	4 0.	74.740		— 35.701	
B^1		(39.039)			
B^2	9 0.	74.778		— 35.739	
B^1		(39.039)			
Star κ . . .	13 57.7	(39.039)	+ 1 19.1	+ 30.795	
B^1	15 16.8	69.834			
Star κ . . .	16 48.2	(39.039)	+ 1 21.8	+ 30.591	
B^1	8 18 10.0	69.630			

Corr. of Chron. . . . . m. s. — 2 31.4.

	h. m. s.	° ″
Star κ	4 52 37.40	— 12 46 22.45

	Sid. time. h. m. s.	m. s.	′ ″
B^1—Star κ . .	7 43 21.7	— 1 10.41	+ 8 13.39
Δ ρ . . .		+ .02	+ .57
B^2—B^1 . .	7 54 40.2	— 0 32.93	
	8 3 58.6		— 9 10.30
Δ ρ . . .		— .03	— .64

After moonrise B^2 disappeared—before, it was seen with a very faint reddish nucleus. An appearance of cometary fragments about B^1. There seem to be three more distinctly marked than on any previous night.

MARCH 17.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ ρ	Comet—Star. Δ mic.	Observer.
Star λ . . .	7 52 21.5		+ 0 3.5		M.
B^2	52 25.0				
Star λ . . .	53 40.0		+ 0 5.5		
B^2	53 45.5				
Star λ . . .	55 3.0		+ 0 6.0		
B^2	55 9.0				
Star λ . . .	55 50.0		+ 0 6.2		
B^2	55 56.2				
Star λ . . .	56 49.5		+ 0 6.5		
B^2	7 56 56.0				

MARCH 17—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ a.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star λ . . .	7 57 27.0		+ 0 6.0		M.
B^2	57 33.0				
Star λ . . .		(39.028)			
B^2	58 50.	52.744		+ 13.716	
B^2	8 1 0.	52.950		+ 13.922	
B^2	3 30.	52.930		+ 13.902	
Star λ . . .	10 58.8	(39.028)	+ 0 49.4	— 21.370	
B^1	11 48.2	17.648			
Star λ . . .	12 59.4	(39.028)	+ 0 50.0	— 20.950	
B^1	13 49.4	18.078			
Star λ . . .	14 52.4	(39.028)	+ 0 53.0	— 20.880	
B^1	15 45.4	18.148			
Star λ . . .	16 34.0	(39.028)	+ 0 52.8	— 20.794	
B^1	17 26.8	18.234			
Star μ . . .	17 50.8	34.488	— 0 24.0	— 16.254	
Star λ . . .	19 54.0	(39.028)	+ 0 52.8	— 20.903	
B^1	20 46.8	18.125			
Star λ . . .	22 3.8	(39.028)	+ 0 54.2	— 21.183	
B^1	22 58.0	17.845			
Star λ . . .	24 27.4	(39.028)	+ 0 54.4	— 21.078	
B^1	25 21.8	17.950			
Star λ . . .	26 31.5	(39.028)	+ 0 56.3	— 21.050	
B^1	27 27.8	17.978			
Star μ . . .	27 47.8	34.653	— 0 20.0	— 16.675	
Star λ . . .	30 29.2	(39.028)	+ 0 55.3	— 21.650	
B^1	31 24.5	17.378			
Star λ . . .	32 50.8	(39.028)	+ 0 58.0	— 21.096	
B^1	33 48.8	17.932			
Star μ . . .	34 8.0	34.554	— 0 19.2	— 16.622	
Star λ . . .	35 46.0	(39.028)	+ 0 59.0	— 21.148	
B^1	36 45.0	17.880			
Star λ . . .	42 22.4	(39.028)	+ 1 2.8	— 21.938	
B^1	43 25.2	17.090			
Star λ . . .	44 48.0	(39.028)	+ 1 2.6	— 22.130	
B^1	45 50.6	16.898			
Star λ . . .	47 20.8	(39.028)	+ 1 3.7	— 22.160	
B^1	48 24.5	16.868			
Star λ . . .	53 45.4	(39.028)	+ 1 7.6	— 22.488	
B^1	54 53.0	16.540			
Star λ . . .	59 16.8	(39.028)	+ 1 8.2	— 22.623	
B^1	9 0 25.0	16.405			

Corr. of Chron. . . m. s. — 2 37.8.

	h. m. s.	° ′ ″
Star λ	5 18 34.60	— 13 16 29.99

	Sid. time. h. m. s.	m. s.	′ ″
B^2—Star λ .	7 52 39.7	+ 0 5.62	
	58 28.7		+ 3 33.33
Δ ρ . .		+ .01	+ .23
B^1—Star λ .	8 29 22.2	+ 0 57.51	— 5 30.69
Δ ρ . .		— .02	— .44
B^1—Star μ .	8 23 36.7	— 0 21.07	— 4 14.46
Δ ρ . .		— .02	— .34

B^2 is so faint that, but for B^1 as a guide, should not be able to see it. A very diffused mass of exceedingly faint nebulous matter.

Bad night for observations, though perfectly clear. No appearance of fragments about B^1.

MARCH 21.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ a.	Comet—Star. Δ mic.
	h. m. s.	*Revs.*	m. s.	*Revs.*
Star ν . . .	8 8 52.4	(39.011)	+ 0 48.4	+ 24.686
B^1	9 40.8	63.697		
Star ξ . . .	12 48.4	63.697	— 3 7.6	0.000
Star π . . .	13 29.6	56.470	— 3 48.8	+ 7.227
Star ν . . .	15 46.6	(39.011)	+ 0 51.9	+ 24.757
B^1	16 38.5	63.768		
Star ξ . . .	19 43.2	63.710	— 3 4.7	+ 0.058
Star π . . .	20 23.3	56.462	— 3 44.8	+ 7.306
Star ν . . .	22 2.5	(39.011)	+ 0 53.3	+ 24.267
B^1	22 55.8	63.278		
Star ξ . . .	25 58.5	63.799	— 3 2.7	— 0.521
Star o . . .	26 19.8	76.600	— 3 24.0	— 13.322
Star π . . .	26 38.5		— 3 42.7	
B^2	32 56.6		+ 0 42.2	
B^1	33 38.8			
B^2		73.254		— 34.243
B^1	36 30.	(39.011)		
B^2	38 40.8		+ 0 41.8	
B^1	39 22.6			
B^2		72.954		— 33.943
B^1	44 0.	(39.011)		
B^2	47 41.6		+ 0 45.4	
B^1	48 27.0			
B^2		72.995		— 33.984
B^1	49 20.	(39.011)		
Star ρ . . .	57 9.1	(39.011)	+ 4 57.9	+ 26.019
B^1	9 2 7.0	65.030		
Star ρ . . .	4 53.2	(39.011)	+ 5 1.0	+ 25.627
Star ν . . .	8 42.8		+ 1 11.4	
B^1	9 54.2	64.638		
Star ξ . . .	12 40.5	66.372	— 2 46.3	— 1.734
Star π . . .	13 21.4	59.122	— 3 27.2	+ 5.516
Star ρ . . .	18 57.5	(39.011)	+ 5 6.0	+ 25.388
B^1	9 24 3.5	64.399		

Corr. of Chron. . . m. s. — 2 46.6.

	h. m. s.	° ′ ″
Star ν	5 53 15.39	— 14 11 35.54
Star ξ	5 57 12.77	— 14 5 18.45
Star o	5 57 34.70	— 14 1 59.57
Star π	5 57 53.34	— 14 7 9.76
Star ρ	5 49 24.73	— 14 12 17.96

	Sid. time. h. m. s.	m. s.	′ ″
B^1—Star ν . .	8 27 0.7	+ 0 56.25	
	13 38.4		+ 6 18.53
Δ ρ . . .		+ .02	+ .43
B^1—Star ξ . .	8 27 0.7	+ 3 0.32	— 0 8.45
Δ ρ . . .		.00	.00
B^1—Star o . .	8 20 9.2	— 3 24.00	— 3 25.24
Δ ρ . . .		— .01	— .23
B^1—Star π . .	8 27 0.7	— 3 40.87	
	29 17.9		+ 1 42.96
Δ ρ . . .		.00	+ .12
B^1—Star ρ . .	9 3 14.0	+ 4 59.45	+ 6 37.84
Δ ρ . . .		+ .02	+ .45
B^2—B^1 . . .	8 37 42.9	— 0 43.13	
	40 30.1		+ 8 44.67
Δ ρ . . .		+ .03	+ .58

NOTE.—A new system of wires was inserted in the diaphragm of th filar-micrometer between March 22 and 30, consisting of three transit and thr micrometer wires. The constant values belonging to this new system a given in the preface.

March 30.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs*	m. s.	*Revs.*	
σ . . .	10 36 25.0*	1.33.320	+ 3 44.1	— 46.580	M.
τ . . .	37 20.3	1.37.416	+ 2 48.8	— 70.676	
υ . . .	38 20.7	3.39.190	+ 1 48.4	+ 7.520	
. . I	39 56.2				
. . II	40 9.3	3.46.710			
. . III	40 21.9				
σ . . I	42 47.3		+ 3 49.5		
. . II	42 59.9	1.43.940	3 49.9	— 47.814	
. . III	43 13.1		3 49.7		
τ . . II	43 56.4		+ 2 53.4		
. . III	44 8.8		2 54.0		
υ . . I	44 45.3		+ 1 51.5		
. . II	44 57.8	3.39.540	1 52.0	+ 6.556	
. . III	45 11.2		1 51.6		
. . I	46 36.8				
. . II	46 49.8	3.46.096			
. . III	47 2.8				
. . I	52 32.9		+ 3 51.6		
. . II	52 45.4	2.61.052	3 51.9	— 48.399	
. . III	52 57.8		3 51.7		
. . I	53 28.8		+ 2 55.7		
. . II	53 41.3	1.54.162	2 56.0	— 71.496	
. . III	53 54.9		2 54.6		
. . I	56 24.5				
. . II	56 37.3	3.42.636			
. . III	56 49.5				
. . I	11 7 34.2		+ 1 58.2		
. . II	7 47.2		1 56.7		
. . III	7 59.7		+ 1 55.8		
. . I	9 32.4				
. . II	9 43.9				
. . III	11 9 55.5				

Corr. of Chron. . . . . — 3 12.2. (m. s.)

	h. m. s.	° ′ ″
r σ	7 8 7.70	— 14 21 5.29
r τ	7 9 4.49	14 14 52.51
r υ	7 10 5.38	— 14 35 1.00

	Sid. time. h. m. s.	m. s.	′ ″
—Star σ . .	10 44 39.9	+ 3 48.52	— 12 13.30
ρ . . .		— .10	— 1.54
—Star τ . .	10 44 39.9	+ 2 52.65	
	45 11.1		— 18 15.18
ρ . . .		— .14	— 2.30
—Star υ . .	10 49 2.1	+ 1 52.34	
	40 17.3		+ 1 48.43
ρ . . .		+ .01	+ .23

Comet almost obscured by haze. B² entirely invisible.

* Recorded 35.0.

March 31.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star φ . . I	10 51 26.8		+ 1 57.0		W.
. . II	51 39.2	3.51.226	1 57.5	+ 17.757	
. . III	51 51.7		1 58.1		
B¹ . . I	53 23.8				
. . II	53 36.7	(39.000)			
. . III	53 49.8				
Star φ . . I	57 26.8		+ 1 55.0		
. . II	57 38.8	3.51.182	1 55.4	+ 17.801	
. . III	57 50.2		1 56.5		
B¹ . . I	59 21.8				
. . II	59 34.2	(39.000)			
. . III	10 59 46.7				

Corr. of Chron. . . — 3 15.3. (m. s.)

	Sid time. h. m. s.	m. s.	′ ″
B¹—Star φ . .	10 53 20.1	+ 1 56.58	+ 4 33.91
		+ .03	+ .49

Observations very uncertain. Comet almost invisible. B² could not be seen at all.

April 3.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*.	Comet—Star. Δ mic.	Observer.
Star χ . . I	10 30 25.2		+ 4 54.8		W.
. . II	30 38.2	2.10.252	4 54.3	+ 4.950	
. . III	30 50.5		4 55.5		
Star ψ . . II	31 6.0	(38.972)	+ 4 26.5	— 23.770	
. . III	31 19.4		4 26.6		
B¹ . . I	35 20.0				
. . II	35 32.5	2.15.202			
. . III	35 46.0				
Star χ . . I	40 31.0		+ 4 57.5		
. . II	40 44.0	2.10.274	4 59.5	+ 5.768	
. . III	40 57.0		4 59.5		
Star ψ . . I	40 59.0		+ 4 29.5		
. . II	41 11.7	(38.972)	4 31.8	— 22.930	
. . III	41 23.5		4 33.0		
B¹ . . I	45 28.5				
. . II	45 43.5	2.16.042‡			
. . III	10 45 56.5				

Corr. of Chron. . . — 3 23.8. (m. s.)

	h. m. s.	° ′ ″
Star χ	7 38 25.70	— 14 19 35.65
Star ψ	7 38 52.94	— 14 11 58.78

	Sid time. h. m. s.	m. s.	′ ″
B¹—Star χ . .	10 37 14.2	+ 4 56.85	+ 1 22.56
Δ ρ . . .		.00	+ .11
B¹—Star ψ . .	10 37 14.2	+ 4 32.95	— 5 59.73
Δ ρ . . .		+ .02	— .48

Comet very faint and difficult of observation.

‡ Recorded 11.042.

April 15.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ a.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star ω . . I	10 4 11.3		+ 1 49.2		M.
. . II	4 23.7	(38.882)	1 48.5	— 1.848	
. . III	4 35.8		1 50.8		
B¹ . . I	6 0.5				
. . II	6 12.2	2.37.034			
. . III	6 26.6				
Star ω . . I	9 5.0		+ 1 49.8		
. . II	9 17.7	(38.882)	1 52.7	— 0.382	
. . III	9 30.1				
B¹ . . I	10 54.8	2.38.500			
. . II	11 22.8				
Star ω . . I	12 49.4		+ 1 50.5		
. . II	13 2.2	(38.882)	1 50.6	— 0.778	
. . I	13 14.2		1 51.0		
B¹ . . III	14 39.9				
. . II	14 52.8	2.38.104			
. . III	15 5.2				
Star ω . . I	16 18.3		+ 1 53.4		
. . II	16 30.5	(38.882)	1 53.4	+ 0.468	
. . III	16 43.3		1 52.2		
B¹ . . I	18 11.7				
. . II	18 23.9	2.39.350			
. . III	18 35.5				
Star ω . . I	19 35.5		+ 1 52.7		
. . II	19 47.8	(38.882)	1 52.5	+ 0.286	
. . III	20 0.5		1 53.5		
B¹ . . I	21 28.2				
. . II	21 40.3	2.39.168			
. . III	21 54.0				
Star ω . . I	23 15.6		+ 1 54.2		
. . II	23 28.3	(38.882)	1 56.6	+ 0.458	
. . III	23 40.5		1 57.3		
B¹ . . I	25 9.8				
. . II	25 24.9	2.39.340			
. . III	25 37.8				
Star ω . . I	26 34.5		+ 1 53.7		
. . II	26 47.4	(38.882)	1 55.5	+ 0.468	
. . III	27 0.0		1 55.6		
B¹ . . I	28 28.2				
. . II	28 42.9	2.39.350			
. . III	28 55.6				
Star ω . . I	30 29.4		+ 1 57.4		
. . II	30 41.6	(38.882)	1 58.7	+ 0.563	
. . III	30 54.5		1 58.1		
B¹ . . I	32 26.8				
. . II	32 40.3	2.39.445			
. . III	32 52.6				
Star ω . . I	34 44.7		+ 1 57.4		
. . II	34 57.2	(38.882)	1 58.3	+ 0.740	
. . III	35 9.4		1 58.2		
B¹ . . I	36 42.1				
. . II	36 55.5	2.39.622			
. . III	10 37 7.6				

April 15—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ a.	Comet—Star. Δ mic.
	h. m. s.	*Revs.*	m. s.	*Revs.*
Star ω . . I	10 47 10.0		+ 1 59.2	
. . II	47 22.5	(38.882)	2 0.0	+ 3.2
. . III	47 34.9		1 59.6	
B¹ . . I	49 9.2			
. . II	49 22.5	2.40.102		
. . III	10 49 34.5			

Corr. of Chron. . . m. s. — 4 0.8.

	h. m. s.	° ′ ″
Star ω	7 59 56.12	— 12 41 56

	Sid. time. h. m. s.	m. s.	′ ″
B¹—Star ω .	10 20 31.6	+ 1 54.50	+ 0 18
Δ ρ . .		.00	+

B² entirely invisible : B¹ faint and diffused, without any central n
There appeared now and then to be several groups of nuclei with bright
recurring by glimpses.

April 19.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ a.	Comet—Star. Δ mic.
Star A . . I	12 9 39.2		+ 0 46.0	
. . II	9 51.4	1.39.000	0 45.1	— 2.8
. . III	10 4.1		0 46.4	
B¹ . . I	10 25.2			
. . II	10 36.5	2.66.112		
. . III	10 50.5			
Star A . . I	29 4.5		+ 0 46.5	
. . II	29 17.3	(39.000)	0 47.1	— 4.2
. . III	29 30.4		0 47.1	
B¹ . . I	29 51.0			
. . II	30 4.4	2.34.788		
. . III	12 30 17.5			

Corr. of Chron. . . m. s. — 4 14.5.

	h. m. s.	° ′
Star A	9 22 25.98	— 12 4 12

	Sid. time. h. m. s.	m. s.	′
B¹—Star A . .	12 16 5.9	+ 0 46.37	— 0 54
Δ ρ . . .		.00	—

Comet very faint ; seen with extreme difficulty, and would not be
minated.

I. Observations of the second Comet of 1846.*

March 3.

bject.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
. . .	6 29 17.0	(39.952)	+ 1 9.0	+ 7.120	M.
. . .	30 26.0	47.072			
. . .	32 4.5	(39.952)	+ 1 10.0	+ 7.363	
. . .	32 53.5		+ 0 21.0		
. . .	33 14.5	47.315			
. . .	34 7.8	28.318	— 0 53.3	+ 18.997	
. . .	36 5.7	(39.952)	+ 1 8.5	+ 8.453	
. . .	36 53.8	37.032	+ 0 20.4	+ 11.373	
. . .	37 14.2	48.405			
. . .	38 8.0	28.490	— 0 53.8	+ 19.915	
. . .	40 1.0	(39.952)	+ 1 8.4	+ 9.753	
. . .	40 48.0	37.230	+ 0 21.4	+ 12.475	
. . .	41 9.4	49.705			
. . .	42 3.6	28.880	— 0 54.2	+ 20.825	
. . .	44 30.6	(39.952)	+ 1 8.2	+ 11.138	
. . .	45 18.8*	37.380	+ 0 20.0	+ 13.710	
. . .	45 38.8	51.090			
. . .	6 46 32.8†	28.942	— 0 54.0	+ 22.148	

	m. s.
Corr. of Chron. . . .	— 1 56.6.

	h. m. s.	° ′ ″
r *a*	0 59 8.93	+ 11 15 18.33
r *b*	0 59 55.96	11 14 41.80
r *c*	1 1 10.72	11 12 27.12

	Sid. time. h. m. s.	m. s.	′ ″
net—Star *a*	6 35 36.0	+ 1 8.82	+ 2 15.03
. .		+ .02	+ .38
net—Star *b*	6 37 22.6	+ 0 20.70	
	39 24.2		+ 3 12.87
. .		+ .04	+ .54
net—Star *c*	6 37 22.6	— 0 53.82	+ 5 15.38
. .		+ .06	+ .89

March 4.

. . .	6 15 49.0	(39.982)	+ 0 21.5	— 18.176	M.
. . .	16 10.5	21.806			
. . .	17 52.0	(39.982)	+ 0 22.0	— 17.814	
. . .	18 14.0	22.168			
. . .	20 55.8	(39.982)	+ 0 21.2	— 17.420	
. . .	21 17.0	22.562			
. . .	22 3.7	(39.982)	+ 0 20.7	— 17.042	
. . .	22 24.4	22.940			
. . .	23 20.4	(39.982)	+ 0 21.4	— 16.564	
. . .	23 41.8	23.418			
. . .	24 37.0	(39.982)	+ 0 21.9	— 16.058	
. . .	6 24 58.9	23.924			

March 4—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star *d* . . .	6 26 15.8	(39.982)	+ 0 21.4	— 15.796	M.
Comet . . .	26 37.2	24.186			
Star *d* . . .	28 8.0	(39.982)	(*d*—*e*.)	(*d*—*e*.)	
Star *e* . . .	28 31.8	43.662	— 0 23.8	— 3.680	
Star *d* . . .	29 30.5	(39.982)	(*d*—*f*)	(*d*—*f*)	
Star *f* . . .	29 39.6	69.680	— 0 9.1	— 29.698	
Star *d* . . .	34 50.0	(39.982)			
Star *f* . . .	6 34 58.5	69.645	— 0 8.5	— 29.663	

	m. s.
Corr. of Chron. . . .	— 2 0.5.

	h. m. s.	° ′ ″
Star *e*	1 0 4.89	+ 12 52 8.01
Star *f*	0 59 49.52	12 58 40.51

	Sid. time. h. m. s.	m. s.	′ ″
Star *d*—Star *e*	6 26 7.5	— 0 23.80	— 0 56.69
Δ ρ		.00	— .10
Star *d*—Star *f*	6 30 9.7	— 0 8.80	— 7 37.24
Δ ρ		— .06	— .84
Comet—Star *d*	6 19 54.3	+ 0 21.44	— 4 21.66
Δ ρ		— .03	— .48

March 5.

Star *g* . . .	5 49 21.4	(39.958)	+ 2 45.1	+ 24.676	M.
Star *h* . . .	50 3.8	49.272	+ 2 2.7	+ 15.362	
Comet . . .	52 6.5	64.634			
Star *g* . . .	53 21.8	(39.958)	+ 2 45.2	+ 25.720	
Star *h* . . .		49.408		+ 16.270	
Comet . . .	56 7.0	65.678			
Star *g* . . .	57 17.8	(39.958)	+ 2 45.7	+ 27.030	
Star *h* . . .	58 1.8	49.354	+ 2 1.7	+ 17.634	
Comet . . .	6 0 3.5	66.988			
Star *g* . . .	1 23.8	(39.958)	+ 2 44.7	+ 27.862	
Star *h* . . .	2 7.4	49.334	+ 2 1.1	+ 18.486	
Comet . . .	4 8.5	67.820			
Star *g* . . .	5 21.2	(39.958)	+ 2 45.0	+ 28.858	
Star *h* . . .	6 4.4	49.282	+ 2 1.8	+ 19.534	
Comet . . .	8 6.2	68.816			
Star *g* . . .	13 12.8	(39.958)	+ 2 44.8	+ 30.614	
Comet . . .	6 15 57.6	70.572			

	m. s.
Corr. of Chron. . . .	— 2 4.7.

	h. m. s.	° ′ ″
Star *g*	0 56 58.33	+ 14 7 1.27

	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star *g*	6 0 40.2	+ 2 45.08	+ 7 3.05
Δ ρ		+ .02	+ .41
Comet—Star *h*	5 59 1.5		+ 2 1.82
	58 1.6		+ 4 28.94
Δ ρ		+ .01	+ .26

Observations very satisfactory. The Comet presented a concentration of pearly light, with an almost planetary disc, surrounded by a luminous nebulosity.

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* Discovered by De Vico, February 20, 1846.

† Recorded 8.8. ‡ Recorded 2.8.

March 7.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star *i* . . .	5 49 51.8	(39.969)	+ 1 20.2	— 4.847	M.
Comet . . .	51 12.0	35.122			
Star *i* . . .	57 50.0	(39.969)	+ 1 20.1	— 2.148	
Comet . . .	59 10.1	37.821			
Star *i* . . .	6 0 59.8	(39.969)	+ 1 19.9	— 1.574	
Comet . . .	2 19.7	38.395			
Star *i* . . .	3 42.1	(39.969)	+ 1 20.1	— 0.465	
Comet . . .	4 2.2	39.504			
Star *i* . . .	10 6.0*	(39.969)	+ 1 19.5	+ 0.755	
Comet . . .	11 25.5	40.724			
Star *i* . . .	12 50.5†	(39.969)	+ 1 19.0	+ 1.353	
Comet . . .	6 14 9.5	41.322			

Corr. of Chron. . — 2 m. 11.0 s.

	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star *i*	5 58 12.2	+ 1 19.80	— 0 17.78
Δ ρ		.00	.00

Observations made through thick clouds.

March 8.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.	Observer.
Star *j* . . .	5 53 24.0	(39.970)	+ 0 4.6	— 29.202	M.
Comet . . .	53 28.6	10.768			
Star *j* . . .	55 15.0		+ 0 5.0		
Comet . . .	55 20.0				
Star *j* . . .	57 3.0	(39.970)	+ 0 5.2	— 28.522	
Comet . . .	57 8.2	11.448			
Star *j* . . .	6 5 10.4	(39.970)	+ 0 4.6	— 27.676	
Comet . . .	5 15.0	12.294			
Star *j* . . .	7 21.8	(39.970)	+ 0 4.2	— 26.204	
Comet . . .	7 26.0	13.766			
Star *j* . . .	13 50.8	(39.970)	+ 0 5.1	— 24.932	
Comet . . .	13 55.9	15.038			
Star *j* . . .	15 32.4	(39.970)	+ 0 5.2	— 24.508	
Comet . . .	15 37.6	15.462			
Star *j* . . .	16 37.2	(39.970)	+ 0 4.4	— 24.289	
Comet . . .	16 41.6	15.681			
Star *j* . . .	17 40.8	(39.970)	+ 0 5.2	— 24.085	
Comet . . .	17 46.0	15.885			
Star *j* . . .	18 34.0	(39.970)	+ 0 5.4	— 23.768	
Comet . . .	18 39.4	16.202			
Star *j* . . .	19 35.4	(39.970)	+ 0 4.8	— 23.400	
Comet . . .	6 19 40.2	16.570			

* Recorded 16.0. † Recorded 40.5.

March 8—continued.

Observer.	Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.
		h. m. s.	*Revs.*	m. s.	*Revs.*
M.	Star *j* . . .	6 29 48.8	(39.970)	+ 0 4.8	— 21.
	Comet . . .	6 29 53.6	18.710		

Corr. of Chron. . . — 2 m. 13.9 s.

	h. m. s.	° ′
Star *j*	0 58 17.72	+ 18 35

	Sid. time. h. m. s.	m. s.	′
Comet—Star *j*	6 3 47.7	+ 0 4.87	— 6 2
Δ ρ		— .02	—

March 10.

Observer.	Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.
	Comet . . .	6 24 23.5	40.372		
	Star *k* . . .	25 16.4		— 0 52.9	
	Star *l* . . .	27 6.3	(39.966)	— 2 42.8	+ 0.
	Comet . . .	30 45.8	31.392		
	Star *k* . . .	31 39.5	32.357	— 0 53.7	— 0.
	Star *l* . . .	33 29.0	30.704	— 2 43.2	+ 0.
	Comet . . .	34 28.3	32.533		
	Star *k* . . .	35 21.5	32.772	— 0 53.2	— 0.
	Star *l* . . .	37 10.8	31.014	— 2 42.5	+ 1.
	Comet . . .	38 19.7*	33.784		
	Star *k* . . .	39 13.6	33.142	— 0 53.9	+ 0.
	Star *l* . . .	41 3.2	31.349	— 2 43.5	+ 2.
	Comet . . .	41 51.5	34.976		
M.	Star *k* . . .	42 45.2	33.534	— 0 53.7	+ 1.
	Star *l* . . .	44 34.8	31.769	— 2 43.3	+ 3.
	Comet . . .	46 7.2	36.175		
	Star *k* . . .	47 0.8	33.986	— 0 53.6	+ 2.
	Star *l* . . .	6 48 50.6	32.288	— 2 43.4	+ 3.

Corr. of Chron. . . — 2 m. 18.5 s.

	h. m. s.	° ′ ″
Star *l*	0 59 52.65	+ 21 9 1

	Sid. time. h. m. s.	m. s.	′
Comet—Star *k* . .	6 36 0.0	— 0 53.50	+ 0
Δ ρ		.00	
Comet—Star *l* . .	6 33 40.8	— 2 43.12	+ 0 3
Δ ρ		.00	+

Comet pale white, with no nucleus or stellar point, though well co in the center. Tail about 15′ long.

March 11.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ α	Comet—Star. Δ mic.
Comet . . .	6 35 16.5	(39.025)		
Star *m* . . .	37 11.0	30.404	— 1 54.5	+ 8.
Comet . . .	39 2.0	42.706		
Star *m* . . .	6 40 57.5	33.415	— 1 55.5	+ 9.

* Recorded 14.7.

MARCH 11—continued.

bject.	Chron. times of transit.	Mic. readings.	Comet—Star.		Observer.
			Δ *a*	Δ mic.	
	h. m. s.	*Revs.*	m. s.	*Revs.*	
. . . .	6 49 1.5	44.756			M.
. . . .	50 57.5	34.392	— 1 56.0	+ 10.364	
. . . .	51 56.5	46.820			
. . . .	6 53 52.0	34.689	— 1 55.5	+ 12.131	

Corr. of Chron. . . . m. s. — 2 23.3.

		h. m. s.	° ′ ″
r *m*		0 58 22.85	+ 22 24 39.69

	Sid. time. h. m. s.	m. s.	′ ″
met—Star *m* . .	6 41 25.8	— 1 55.38	+ 2 35.63
. . . .		.00	+ .12

MARCH 14.

. . .	6 37 34.0	(39.039)	+ 5 4.0	— 7.928	M.
. . .	38 24.6	20.956	+ 4 13.4	+ 10.155	
. . .	42 38.0	31.111			
. . .	56 37.7	(39.039)	+ 5 4.3	— 4.489	
. . .	57 28.7	20.782	+ 4 13.3	+ 13.768	
. . .	7 1 42.0	34.550			

Corr. of Chron. . . . m. s. — 2 31.4.

		h. m. s.	° ′ ″
r *n*		0 48 58.42	+ 26 9 54.29

	Sid. time. h. m. s.	m. s.	′ ″
net—Star *n* . .	6 50 38.6	+ 5 4.15	— 1 35.65
. . . .		— .01	— .13
net—Star *o* . .	6 50 38.6	+ 4 13.35	+ 3 4.27
. . . .		+ .02	+ .25

MARCH 17.

. . .	6 46 19.9	(39.028)	+ 1 36.3	+ 15.884	M.
. . .	47 56.2	54.912			
. . .	49 14.6	(39.028)	+ 1 35.8	+ 16.522	
. . .	50 50.4	55.550			
. . .	52 4.2	(39.028)	+ 1 36.2	+ 17.261	
. . .	53 40.4	56.289			
. . .	54 54.2	(39.028)	+ 1 36.4	+ 17.577	
. . .	56 30.6	56.605			
. . .	57 39.2	(39.028)	+ 1 36.9	+ 18.120	
. . .	59 16.1	57.148			
. . .	7 1 12.4	34.804	+ 3 28.9	+ 23.104	
. . .	3 5.9	(39.028)	+ 1 35.4	+ 18.880	
. . .	4 41.3	57.908			
. . .	6 38.8	34.784	+ 3 30.9	+ 24.036	
. . .	8 34.0	(39.028)	+ 1 35.7	+ 19.792	
. . .	7 10 9.7	58.820			

MARCH 17—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star.		Observer.
			Δ *a*	Δ mic.	
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star *p* . . .	7 11 5.2	(39.028)	+ 1 34.8	+ 20.398	M.
Comet . . .	7 12 40.0	59.426			

Corr. of Chron. . . . m. s. — 2 37.8.

	h. m. s.	° ′ ″
Star *p*	0 49 38.38	+ 29 29 8.34

	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star *p* . .	6 56 50.3	+ 1 35.94	+ 4 38.14
Δ ρ		+ .02	+ .37
Comet—Star *q* . .	7 4 47.7	+ 3 29.90	+ 6 3.12
Δ ρ		+ .03	+ .48

Comet pearly white, with a straight slender tail opposite the Sun. Occasional glimpses of a diamond-like nucleus.

MARCH 21.

Comet . . .	7 6 45.0	50.554			M.
Star *r* . . .	6 55.8	(39.011)	— 0 10.8	+ 11.543	
Comet . . .	8 54.2	50.934			
Star *r* . . .	9 6.0	(39.011)	— 0 11.8	+ 11.923	
Comet . . .	14 43.5	51.954			
Star *r* . . .	14 54.0	(39.011)	— 0 10.5	+ 12.943	
Comet . . .	16 34.4	50.800			
Star *s* . . .	16 52.5	(39.011)	— 0 18.1	+ 11.789	
Comet . . .	18 54.5	52.458			
Star *r* . . .	19 5.8	(39.011)	— 0 11.3	+ 13.447	
Comet . . .	20 20.8	51.376			
Star *s* . . .	20 37.8	(39.011)	— 0 17.0	+ 12.365	
Comet . . .	22 40.2	53.134			
Star *r* . . .	22 51.6	(39.011)	— 0 11.4	+ 14.123	
Comet . . .	24 35.0	52.218			
Star *s* . . .	24 52.9	(39.011)	— 0 17.9	+ 13.207	
Comet . . .	26 47.8	54.022			
Star *r* . . .	27 0.0	(39.011)	— 0 12.2	+ 15.011	
Comet . . .	30 19.8	53.300			
Star *s* . . .	7 30 37.0	(39.011)	— 0 17.2	+ 14.289	

Corr. of Chron. . . . . m. s. — 2 46.6.

	h. m. s.	° ′ ″
Star *r*	0 47 9.01	+ 33 42 47.83

	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star *r* . .	7 13 40.9	— 0 11.33	+ 3 22.82
Δ ρ		+ .02	+ .33
Comet—Star *s* . .	7 20 10.9	— 0 17.55	+ 3 18.93
Δ ρ		+ .02	+ .33

APRIL 20—continued.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star.		Observer.
			Δ ρ	Δ mic.	
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star δ . . I	17 43 47.7				W.
. . II	44 11.5	1.56.396			
. . III	44 34.6				
Star γ . . I	46 40.8*		— 2 53.1		
. . II	47 3.8		2 52.3		
. . III	47 26.9		2 52.3		
Comet . . I	52 25.2†				
. . II	52 47.5				
. . III	53 11.4				
Star γ . . I	55 26.6		— 3 1.1		
. . II	55 51.3		3 3.8		
. . III	56 15.5		3 4.1		
Comet . . .	59 10	1.54.416			
Star γ . . .		3.42.035		+ 72.351	
Comet . . I	17 2 50.2				
. . II	3 11.3	1.47.350			
. . III	3 35.0				
Star γ . . I	5 53.7§		— 3 3.5		
. . II	6 16.5	3.35.380	3 5.2	+ 71.940	
. . III	6 40.6		3 5.6		
Comet . . .	17 13 3	(39.112)			
Star δ . . .		2.34.998		+ 4.114	
Comet . . .	17 15 0	(39.112)			
Star δ . . .		2.34.682		+ 4.430	

Position and distance of Comet and Star δ :

h. m. s.	° ′	*Revs.*
17 21 30	51 42	2.31.496
24 35	52 25	2.30.938
28 10	49 52	2.30.331

Corr. of Chron. . . . m. s. — 4 18.0.

	h. m. s.	° ′ ″
Star γ	0 0 59.70	+ 58 18 0.60

	Sid. time. h. m. s.	m. s.	′ ″
Star δ—Star γ . .	16 37 45	— 2 52.78	— 19 18.60
Δ ρ		— .06	— 1.22
Comet—Star γ—1st series	15 32 46.4	— 2 52.16	— 20 59.05
Δ ρ		— .09	— 2.62
2d series	16 55 41.4	— 3 3.88	
	56 52.6		— 18 32.40
Δ ρ		— .03	— .71
Comet—Star δ . .	17 9 57.0		+ 1 5.81
Δ ρ			+ .04

APRIL 27.

Object.	Chron. times of transit.	Mic. readings.	Δ ρ	Δ mic.	Observer.
Comet . . I	14 1 52.0				W.
. . II	2 17.0	1.26.924			
. . III	2 54.3				
Star ε . . I	6 14.5		— 4 22.5		
. . II	6 41.3	3.39.275	4 24.3	+ 47.669	
. . III	14 7 18.5‖		4 24.2		

* Recorded 6.8. † Recorded 55.2. ‡ Recorded 50.380.
§ Recorded 48.7. ‖ Recorded 8.5.

MARCH 14.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star.	
			Δ ρ	Δ mic.
	h. m. s.	*Revs.*	m. s.	*Revs.*
Comet . . I	14 20 15.0			
. . II	20 43.2	1.23.300		
. . III	21 10.7			
Star ζ . . I	22 17.0		— 2 2.0	
. . II	22 43.3	3.21.098	2 0.1	+ 62.17
. . III	23 11.4		2 0.7	
Star ε . . I	24 31.8		— 4 16.8	
. . II	24 59.2	2. 8.242	4 16.0	+ 45.04
. . III	25 26.3		4 15.6	
Comet . . I	39 34.2			
. . II	40 2.7	1.37.902		
. . III	40 29.0			
Star ζ . . I	41 38.5		— 2 4.3	
. . II	42 6.0	3.38.708	2 3.3	+ 59.16
. . III	42 33.7		2 4.7	
Star ε . . I	43 54.3		— 4 20.1	
. . II	44 21.0	3.56.024	4 19.3	+ 41.84
. . III	14 44 48.3		4 19.3	

Corr. of Chron. . . . m. s. — 0 37.3.

	h. m. s.	° ′ ″
Star ε	23 42 55.60	62 53 12.
Star ζ	23 40 40.68	62 57 39.

	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star ε .	14 20 23.6	— 4 19.79	— 11 30.
Δ ρ		— .04	— 1.
Comet—Star ζ .	14 29 45.5	— 2 2.52	— 15 34.
Δ ρ		— .06	— 2.

Comet very faint, and soon lost in haze.

MAY 2.

Object.	Chron. times of transit.	Mic. readings.	Δ ρ	Δ mic.
Star η . . .	15 0 4.5	(38.985)	+ 0 29.0	+ 14.04
Comet . . .	0 33.5*	2.53.030		
Star η . . .	1 6.4		+ 0 28.2	
Comet . . .	1 34.6			
Star η . . .	8 3.5		+ 0 27.2	
Comet . . .	8 30.7			
Star η . . .	9 4.5	(38.985)	+ 0 27.1	+ 13.75
Comet . . .	9 31.6	2.52.744		
Star η . . .	13 20.1	(38.985)	+ 0 26.9	+ 13.04
Comet . . .	13 47.0	2.52.032		
Star η . . .	14 22.0		+ 0 24.1	
Comet . . .	14 46.1			
Star η . . .	17 27.2	(38.985)	+ 0 24.3	+ 12.71
Comet . . .	15 17 51.5	2.51.702		

* Recorded 37.5.

May 2—continued.

ect.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
. . .	15 18 27.4		+ 0 22.9		W.
. . .	15 18 50.3				

Observation of position and distance of Comet and Star η:

		Pos. Vernier.	Mic.
		° ′	*Revs.*
runs along mic. wire . .		92 30	(38.985)
	h. m. s.	° ′	
t wire joining Comet and Star η	15 26 1.5	48 40	2.53.068
	32 44.5	47 31	2.53.204
	37 25.0	51 52	2.52.972
	44 1.5	48 34	2.51.518*
	47 41.0	46 14	2.51.298
	58 46.5	52 58	2.48.080
	16 1 39.0	46 42	2.48.181

Corr. of Chron. . . . . m. s. — 0 52.4.

	h. m. s.	° ′ ″
η	23 19 8.02	+ 66 4 25.50

	Sid. time. h. m. s.	m. s.	′ ″
et—Star η . .	15 9 48.3	+ 0 26.21	
	9 33.5		— 3 26.32
. . .		— .01	— .19

May 19.

. . I	14 14 58.5				W.
. . II	15 49.1				
. . III	16 35.4				
. . I	16 55.0		— 1 56.5		
. . II	17 43.0		1 53.9		
. . III	14 18 30.6		1 55.2		

* Recorded 61*r*.

May 19.

Object.	Chron. times of transit.	Mic. readings.	Comet—Star. Δ *a*.	Comet—Star. Δ mic.	Observer.
	h. m. s.	*Revs.*	m. s.	*Revs.*	
Comet . . .	14 19 50	2.22.066			W.
Star ϑ . . .		2.34.600*		— 12.534	

Observation of position and distance of Comet and Star ϑ:

		Pos. Vernier.	Mic.
		° ′	*Revs.*
Star runs along mic. wire		92 30	(38.940)
	h. m. s.	° ′	
Transit wire joining Comet and Star ϑ	14 32 26.5	15 54	2.6.272
	38 33.0	14 17	2.5.312
	42 23.0	15 33	2.4.652
	46 3.5	14 16	2.4.382
	50 36.0	13 28	2.5.286
	57 7.5	15 16	2.3.518
	15 0 30.0	13 47	2.2.453
	3 16.5	14 33	2.2.216

Comet . . I	15 8 32.5				W.
. . II	9 21.2†				
. . III	10 9.4				
Star ϑ . . I	10 57.2		— 2 24.7		
. . II	11 44.0		2 27.8		
. . III	12 31.6		2 22.2		
Star ϑ . . .		(38.940)			
Comet . . .	16 2.0	2.28.076		— 10.864	
Comet . . .	18 12.0	2.28.696		10.244	
Comet . . .	19 29.5	2.28.936		10.004	
Comet . . .	21 6.0	2.29.106		9.834	
Comet . . .	23 23.0	2.29.853		9.087	
Comet . . .	15 26 39.0	2.30.293		— 8.647	

Corr. of Chron. . . m. s. — 1 37.1.

	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star ϑ . .	14 14 12.0	— 1 55.20	
	18 12.9		+ 3 13.10
Δ ρ		+ .05	+ .07
	15 7 44.1	— 2 23.23	
	15 19 11.5		+ 2 30.67
Δ ρ		+ .04	+ .04

* Recorded 28*r*. † Recorded 16.2.

5. OBSERVATIONS OF THE SEVENTH COMET OF 1846.*

MAY 25.

Object.	Chr. time of transit. I.	II.	III.	Mean of wires.	Mic.	Comet—Star. Δ *a*.	Δ mic.	Observer.
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star *a* .	44.8	2.4	19.2	13 41 2.13	(38.801)	+ 4 25.70	+ 35.746	M.
Comet .	10.5	28.0	45.0	45 27.83	3.44.560			
Star *b* .	51.0	8.0	25.0	48 8.00	3.30.752	— 2 40.17	+ 13.808	
Star *a* .	40.5	58.0	16.0	50 58.17	(38.801)	+ 4 26.23	+ 34.446	
Comet .	7.2	24.0	42.0	54 24.40	3.43.360			
Star *b* .	47.5	5.0	22.5	58 5.00	3.30.628	— 2 40.60	+ 12.732	
Star *a* .	32.6	50.0	7.8	14 0 50.13†	(38.801)	+ 4 26.67	+ 32.584	
Comet .	59.4	17.0	34.0	5 16.80	3.41.498			
Star *b* .	39.0	56.2	14.0	14 7 56.40	3.30.420	— 2 39.60	+ 11.078	

Results.

		m. s.	
Corr. of Chron. . . .		— 2 22.0	
	h. m. s.		° ′ ″
Star *b* . .	6 57 59.57		+ 44 29 39.31
	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star *a*	13 52 41.0	+ 4 26.20	+ 8 40.8
Δ ρ		+ .03	+ .0
Comet—Star *b*	13 52 41.0	— 2 40.12	+ 3 13.1
Δ ρ		+ .01	+ .2

MAY 27.

Object.	I.	II.	III.	Mean of wires.	Mic.	Δ *a*.	Δ mic.	Observer.
Comet .	33.0	49.5	7.5	13 42 50.00	2.40.782			W.
Star *c* .	33.5	50.2	7.1	46 50.27	2.32.376	— 4 0.27	+ 8.406	
Star *d* .	27.5	44.0	1.0	54 44.17	2.64.923	—11 54.17	— 24.141	
Star *e* .	8.5	25.5	42.5	56 25.50	2.67.772	—13 35.50	— 26.990	
Comet .	34.5	50.3	7.0	14 12 50.60	2.31.099			
Star *c* .	33.0	49.8	7.0	16 50.03‡	2.26.382	— 3 59·43	+ 4.717	
Star *d* .	27.3	44.0	1.0	24 44.10	1.28.992	—11 53.50	— 27.880	
Star *e* .	8.5	25.5	43.0	14 26 25.67	1.31.932	—13 35.07	— 30.820	

Corr. of Chron. . . .		— 1 53.0	
	h. m. s.		° ′ ″
Star *d* . .	7 10 10.88		+ 42 56 4.46
Star *e* . .	7 11 52.36		42 56 49.68
	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star *c*	13 55 57.3	— 3 59.85	+ 1 41.10
Δ ρ		.00	+ .11
Comet—Star *d*	13 55 57.3	—11 53.83	— 6 40.71
Δ ρ		— .02	— .44
Comet—Star *e*	13 55 57.3	—13 35.28	— 7 25.31
Δ ρ		— .02	— .50

JUNE 6.

Object.	I.	II.	III.	Mean of wires.	Mic.	Δ *a*.	Δ mic.	Observer.
Star *f* .	34.2	50.2	5.2	13 49 49.87	3.40.874	+ 7 4.03	+ 23.891	W.
Star *g* .	25.7	41.4	56.7	51 41.27	1.42.789	+ 5 12.63	— 37.994	
Comet .	39.7	53.2	8.8	56 53.90	2.34.782			
Star *h* .	42.7	58.0	14.1	14 1 58.33	3.43.826	+ 1 44.17	+ 21.275	
Comet .	27.2	42.6	57.7	3 42.50	2.35.118			
Star *f* .	18.2	33.2	49.7	11 33.70	3.43.322	+ 7 5.75	+ 23.037	
Star *g* .	11.2	27.4	42.6	13 27.07	1.46.286	+ 5 12.38	— 39.897	
Star *i* .	40.6	56.2	11.3	17 56.03	1.46.432	+ 0 43.42	— 40.043	
Comet .	25.2		53.7	18 39.45	2.36.376			
Star *f* .	35.5		7.5	22 51.50	3.45.787	+ 7 7.56	+ 23.178	
Star *g* .	30.2	45.5	0.7	24 45.47	1.48.493	+ 5 13.59	— 39.498	
Comet .	43.5	59.2		14 29 59.06	2.38.982			

		m. s.	
Corr. of Chron. . .		— 8 45.2	
	Sid. time. h. m. s.	m. s.	′ ″
Comet—Star *f*	14 6 25.6	+ 7 5.78	+ 6 0.03
Δ ρ		+ .06	+ .95
Comet—Star *g*	14 6 25.6	+ 5 12.87	— 10 2.84
Δ ρ		— .11	— 1.58
Comet—Star *h*	13 54 57.3	+ 1 44.17	+ 5 27.76
Δ ρ		+ .05	+ .80
Comet—Star *i*	14 9 54.2	+ 0 43.42	— 10 16.90
Δ ρ		— .11	— 1.63

* Discovered by Brorsen, April 20, 1846. † Recorded 13*h*. 59*m*. ‡ Recorded 17*m*.

6. Observations of Neptune, 1846.

October 23.

ect.	Chr. time of transit. I.	II.	III.	Mean of wires.	Mic.	Planet—Star. Δ α.	Δ mic.	Observer.	Results.
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*		
.	44.0	56.7	10.0	22 57 56.90	(74.836)	+ 1 22.77	— 38.049	M.	m. s. Corr. of Chron. . . . — 2 11.1 h. m. s. ° ′ ″ Star *a* . . 21 50 9.53 — 13 23 32.80 Sid. time h. m. s. m. s. ′ ″ Planet—Star *a* 23 1 24.0 + 1 22.82 — 9 45.72 Δ ρ — .01 — .47
une	7.2	19.8	32.0	59 19.67	2.36.787				
.	10.8	23.7	36.0	23 2 23.50	(74.836)	+ 1 22.47	— 38.196		
me	33.4	46.0	58.5	3 45.97	2.36.640				
.	4.0	16.2	29.2	6 16.47	(74.836)	+ 1 23.23	— 37.811		
ne	27.2	39.9	52.0	23 7 39.70	2.37.025				

October 24.

ect.	I.	II.	III.	Mean of wires.	Mic.	Δ α.	Δ mic.	Observer.	Results.
.	28.8	41.0	53.8	21 2 41.20		+ 1 20.83		M.	m. s. Corr. of Chron. . . . — 2 12.9 h. m. s. ° ′ ″ Star *a* . . 21 50 9.51 — 13 23 32.86 Sid. time. h. m. s. m. s. ′ ″ Planet—Star *a* 21 3 4.3 + 1 20.96 4 19.6 — 9 50.31 Δ ρ .00 — .44
ne	49.6	2.0	14.5	4 2.03					
.	59.0	11.4	23.8	5 11.40	(74.797)	+ 1 21.10	— 38.317		
ne	19.8	32.7	45.0	21 6 32.50	2.36.480				

October 25.

ect.	I.	II.	III.	Mean of wires.	Mic.	Δ α.	Δ mic.	Observer.	Results.
.	48.2	1.0	13.4	21 57 0.87		+ 1 19.66		M.	
ne	7.6	20.8	33.2	58 20.53					
.	35.8	49.0	1.6	59 48.80		+ 1 19.47			
ne	55.8	8.0	21.0	22 1 8.27					
.	11.0	24.0	36.5	2 25.83		+ 1 19.44			m. s. Corr. of Chron. . . . — 2 14.8
me	30.5	43.5	55.8	3 43.27					h. m. s. ° ′ ″ Star *a* . . 21 50 9.50 — 13 23 32.93
.	59.8	12.5	24.8	7 12.37		+ 1 19.66			Sid. time.
me	19.8	31.8	44.5	8 32.03					h. m. s. m. s. ° ″
.					(74.778)				Planet—Star *a* 22 0 41.2 + 1 19.56
me					2.35.896		— 38.882		22 22 50. — 9 58.94
me					2.35.800		38.978		Δ ρ .00 — .45
me				22 25 5.	2.35.970		38.808		
me					2.35.999		38.779		
me					2.35.858		38.920		
me					2.35.975		38.803		
me					2.35.820		— 38.958		

OCTOBER 26.

Object.	Chr. time of transit. I.	II.	III.	Mean of wires.	Mic.	Planet—Star. Δ α.	Δ mic.	Observer.	Results.
	s.	s.	s.	h. m. s.	Revs.	m. s.	Revs.		
Star a .	19.2	31.4	44.0	21 1 31.53		+ 1 18.07		M.	
Neptune	36.8	49.6	2.4	2 49.60					
Star b .	19.5	32.4	44.8	3 32.23		— 0 42.63			
Star a .	35.2	47.8	0.6	4 47.87		+ 1 18.30			
Neptune	53.5	6.2	18.8	6 6.17					
Star b .	35.8	48.6	1.4	6 48.60		— 0 42.43			
Star a .	36.6	49.5	2.4	7 49.50		+ 1 18.18			
Neptune	55.2	7.6	20.4	9 7.68					
Star b .	37.5	50.4	2.8	9 50.23		— 0 42.55			
Neptune	44.8	57.4	10.0	10 57.40					
Star c .	9.0	21.0	33.6	11 21.20		— 0.23.80			
Neptune	32.4	44.8	57.8	12 45.00					
Star c .	56.0	9.0	21.0	13 8.67		— 0.23.67			
Neptune	2.4	14.8	27.2	14 14.80					
Star c .	26.0	38.0	51.0	14 58.33		— 0 23.53			
Star a .					(44.763)				
Neptune				19 0	3.35.332		— 39.414		
Neptune				20 0	3.35.354		39.392		
Neptune				21 0	3.35.314		— 39.432		
Star c					(44.763)				
Neptune				23 30	3.44.222		— 30.524		
Neptune				24 30	3.44.352		— 30.394		
Neptune				25 30	3.44.228		30.518		
Neptune				26 30	3.44.342		30.404		
Neptune				33 0	3.44.220		— 30.526		
Star b .					(44.763)				
Neptune				28 30	2.49.828		+ 5.065		
Star c .				29 30	2.49.895		5.132		
Star c .				21 31 0	2.49.890		+ 5.127		

					m. s.	
Corr. of Chron. . . .					— 2 18.1	
	h.	m.	s.		° ′	
Star a . .	21	50	9.48		— 13 23	
Star b . .	21	52	10.00		13 34	
Star c . .	21	51	51.19		13 25	
	Sid. time. h.	m.	s.	m. s.		′
Planet—Star a	21	3	43.0	+ 1 18.18		
		17	41.9			— 1
Δ ρ				.00		—
Planet—Star b	21	3	43.0	— 0 42.54		
		24	17.9			+ 1
Δ ρ				.00		+
Planet—Star c	21	10	44.6	— 0 23.67		
		27	21.9			—
Δ ρ				.00		—

OCTOBER 28.

Object.	Chr. time of transit. I.	II.	III.	Mean of wires.	Mic.	Planet—Star. Δ α.	Δ mic.	Observer.	Results.
Star a .	15.0	27.6	40.5	21 51 27.70		+ 1 15.20		M.	
Neptune	30.4	42.8	55.5	52 42.90					
Star b .	15.0	28.0	40.6	53 27.87		— 0 44.97			
Star a .	3.2	15.8	28.5	54 15.83		+ 1 15.04			
Neptune	18.5	30.6	43.5	55 30.87					
Star b .	3.2	15.6	28.4	56 15.73		+ 0 44.86			
Star a .	3.9	16.1	29.0	57 16.33		+ 1 15.44			
Neptune	19.2	31.6	44.5	58 31.77					
Star a .	13.0	25.6	38.0	22 0 25.53		+ 1 15.27			
Neptune	28.0	40.8	53.6	1 40.80					
Star b .	13.2	26.0	38.8	22 2 26.00		— 0 45.20			

OCTOBER 28—continued.

ect.	Chr. time of transit.			Mean of wires.	Mic.	Planet—Star.		Observer.	Results.
	I.	II.	III.			Δ α	Δ mic.		
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*		
une	29.0	41.4	54.0	22 3 41.47				M.	
c .	55.0	7.6	20.4	4 7.67		— 0 26.20			
une	35.0	47.5	0.2*	4 47.57					
c .	1.0	13.8	26.5	5 13.77		— 0 26.20			
une	49.5	1.6	14.0	6 1.70					
c .	15.0	27.8	40.4	6 27.73		— 0 26.03			
s .					(44.775)				
une				10 0	3.34.435		— 40.323		
une				12 30	3.34.396		40.362		
une				13 0	3.34.210		40.548		m. s.
une				14 0	3.34.324		40.434		Corr. of Chron. . . . . — 2 22.3
une				15 0	3.34.610		40.148		
une				18 0	3.34.528		40.230		h. m. s. ° ′ ″
une				19 0	3.34.489		40.269		Star a . . 21 50 9.46 — 13 23 33.10
une				19 45	3.34.572		40.186		Star b . . 21 52 9.97 13 34 57.86
une				20 0	3.34.566		40.192		Star c . . 21 51 51.16 13 25 50.73
une				20 22	3.34.465		— 40.293		
c .					(44.775)				Sid. time.
une				25 0	3.43.393		— 31.365		h. m. s. m. s. ′ ″
une				26 40	3.43.326		31.432		Planet—Star a 21 54 44.3 + 1 15.24
une				27 30	3.43.424		31.334		22 13 47.4 — 10 20.84
une				28 0	3.43.442		31.316		Δ ρ .00 — .46
une				29 0	3.43.508		31.250		Planet—Star b 21 54 15.9 — 0 45.01
une				29 30	3.43.552		31.206		22 39 46.7 + 1 6.42
une				31 30	3.43.430		31.328		Δ ρ .00 + .05
une				32 0	3.43.448		31.310		Planet—Star c 22 2 27.9 — 0 26.14
une				33 0	3.43.528		31.230		22 27 14.7 — 8 2.29
une				34 0	3.43.470		— 31.288		Δ ρ .00 — .36
b .					(44.775)				
une				36 0	2.49.138		+ 4.363		
une				37 0	2.49.150		4.375		
une				38 0	2.49.144		4.369		
une				41 0	2.49.050		4.275		
une				42 0	2.49.058		4.283		
une				43 0	2.49.035		4.280		
une				44 30	2.49.075		4.300		
une				45 30	2.49.088		4.313		
une				46 30	2.49.092		4.317		
une				22 48 0	2.49.012		— 4.237		

OCTOBER 29.

s .	0.8	13.4	26.0	21 16 13.40		+ 1 13.67		M.	
une	15.0	27.2	39.0	17 27.07					
b .	1.0	13.8	26.0	18 13.60		— 0 46.53			
s .	59.0	11.4	24.0	19 11.47		+ 1 14.33			
une	13.0	25.8	38.6	20 25.80					
b .	59.4	12.0	24.6	21 21 12.00		— 0 46.20			

* Recorded 2.0.

OCTOBER 29—continued.

Object.	Chr. time of transit.			Mean of wires.	Mic.	Planet—Star.		Observer.
	I.	II.	III.			Δ α	Δ mic.	
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star *a* .	27.8	40.1	52.8	21 22 40.23		+ 1 14.24		M.
Neptune	41.8	54.6	7.0	23 54.47				
Star *b* .	27.8	40.6	53.6	24 40.67		— 0 46.20		
Neptune	33.8	46.0	59.0	25 46.27				
Star *c* .	1.0	13.5	26.4	26 13.63		— 0 27.36		
Neptune	49.0	1.8	14.2	27 1.67				
Star *c* .	16.8	29.0	41.8	27 29.20		— 0 27.53		
Neptune	2.9	15.5	28.0	28 15.47				
Star *c* .	30.5	42.9	55.0	28 42.80		— 0 27.33		
Star *a* .					(44.782)			
Neptune				30 0	3.34.282		— 40.483	
Neptune				31 0	3.34.165		40.600	
Neptune				32 0	3.34.280		40.485	
Neptune				32 45	3.34.308		40.457	
Neptune				33 30	3.34.335		40.430	
Neptune				34 0	3.34.284		40.481	
Neptune				35 0	3.34.278		40.487	
Neptune				35 30	3.34.255		40.510	
Neptune				36 0	3.34.250		40.515	
Neptune				36 40	3.34.280		— 40.465	
Star *c* .					(44.782)			
Neptune				21 39 40	3.43.284		— 31.481	
Neptune				40 45	3.43.278		31.487	
Neptune				41 30	3.43.220		31.545	
Neptune				42 30	3.43.130		31.635	
Neptune				43 0	3.43.246		31.519	
Neptune				44 0	3.43.240		31.525	
Neptune				44 40	3.43.200		31.565	
Neptune				45 20	3.43.200		31.565	
Neptune				46 0	3.43.258		31.507	
Neptune				46 45	3.43.210		— 31.555	
Star *b* .					(44.782)			
Neptune				49 0	2.48.720		+ 3.938	
Neptune				50 20	2.48.638		3.856	
Neptune				51 30	2.48.738		3.956	
Neptune				52 30	2.48.660		3.878	
Neptune				53 30	2.48.810		4.028	
Neptune				55 0	2.48.758		3.976	
Neptune				56 20	2.48.728		3.946	
Neptune				57 20	2.48.746		3.964	
Neptune				58 40	2.48.740		3.958	
Neptune				22 0 0	2.48.741		+ 3.959	

Results.

		m. s.
Corr. of Chron. . . .		— 2 24.4.
	h. m. s.	° ′ ″
Star *a* . .	21 50 9.44	— 13 23 33.
Star *b* . .	21 52 9.95	13 34 57.
Star *c* . .	21 51 51.14	— 13 25 50.

	Sid. time. h. m. s.	m. s.		′
Planet—Star *a*	21 18 11.4	+ 1 14.08		
	21 31 14.1		—	10
Δ ρ . .		.00		
Planet—Star *b*	21 18 11.4	— 0 46.31		
	21 52 0.6		—	8
Δ ρ . .		.00	—	
Planet—Star *c*	21 24 36.7	— 0 27.41		
	21 41 0.6		+	1
Δ ρ . .		.00	+	

NOVEMBER 3.

Object.	I.	II.	III.	Mean of wires.	Mic.	Δ α	Δ mic.	Observer.
Star *a* .	18.8	31.6	44.2	20 44 31.53		+ 1 10.84		M.
Neptune	29.6	42.5	55.0	45 42.37				
Star *b* .	19.2	31.8	44.6	46 31.87		— 0 49.50		
Star *a* .	33.2	46.1	58.4	47 45.90		+ 1 10.80		
Neptune	44.1	56.6	9.4	48 56.70				
Star *b* .	33.8	46.7	59.4	20 49 46.63		— 0 49.93		

NOVEMBER 3—continued.

ct.	Chr. time of transit.			Mean of wires.	Mic.	Planet—Star.		Observer.	Results.
	I.	II.	III.			Δ α.	Δ mic.		
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*		
.	32.0	44.6	57.0	20 50 44.53		+ 1 10.77		M.	
ne	42.6	55.5	7.8	51 55.30					
.	32.0	44.7	57.6	52 44.77		— 0 49.47			
ne	22.8	35.5	48.0	54 35.43					
.		6.6	19.0	55 6.44		— 0 31.01			
me	49.6	1.8	15.0	56 2.13					
.	20.6	32.7	45.9	56 53.07		— 0 30.94			
me	28.0	40.8	53.6	57 40.80					
.	58.9	11.6	24.4	58 11.63		— 0 30.83			
me	43.4	56.0	9.0	58 56.13					
.		27.0	39.8	59 27.04		— 0 30.91			
.					(39.016)				
ne				21 1 0	3.27.300		— 41.799		
me				2 45	3.27.240		41.859		
me				3 40	3.27.170		41.929		
ne				5 45	3.27.224		41.875		
ne				7 15	3.27.398		41.701		
ne				8 30	3.27.330		41.769		
ne				15 20	3.27.262		41.837		
ne				16 20	3.27.336		41.763		
ne				17 10	3.27.276		41.823		
ne				21 18 0	3.27.312		— 41.787		

Corr. of Chron. . . .		m. s. — 2 34.9.
	h. m. s.	° ′ ″
Star *a* . .	21 50 9.36	— 13 23 33.51
Star *b* . .	21 52 9.87	13 34 58.27
Star *c* . .	21 51 51.06	— 13 25 51.14

	Sid. time. h. m. s.	m. s.	′ ″
Planet—Star *a*	20 46 16.5	+ 1 10.80	
	21 6 59.6		— 10 47.64
Δ ρ . .		.00	— .47
Planet—Star *b*	20 46 16.5	— 0 49.63	
Δ ρ . .		.00	
Planet—Star *c*	20 54 13.7	— 0 30.92	
Δ ρ . .		.00	

Observations interrupted by clouds.

NOVEMBER 9.

.	58.2	11.2	23.2	21 52 11.00		+ 1 10.97		M.	
ne	9.4	21.9	34.6	53 21.97					
.	59.2	11.6	24.8	54 11.87		— 0 49.90			
.	52.0	4.6	17.0	55 4.53		+ 1 10.87			
ne	2.8	15.4	28.0	56 15.40					
.	52.2	5.0	18.0	56 5.07		— 0 49.67			
.	41.6	53.7	6.2	57 53.83		+ 1 10.60			
ne	51.8	4.5	17.0	59 4.43					
.	41.8	54.2	7.0	59 54.33		— 0 49.90			
ne	4.5	17.0	30.0	22 1 17.17					
.	35.6	48.0	0.8	1 48.07		— 0 30.90			
ne	24.0	36.6	49.8	2 36.80					
.	55.0	7.8	20.4	3 7.90		— 0 31.10			
ne	42.8	55.5	8.0	3 55.43					
.	14.0	26.4	39.0	22 4 26.47		— 0 31.04			

Corr. of Chron. . . .		m. s. — 2 47.5.
	h. m. s.	° ′ ″
Star *a* . .	21 50 9.27	— 13 23 33.89
Star *b* . .	21 52 9.78	13 34 58.66
Star *c* . .	21 51 50.97	— 13 25 51.52

	Sid. time. h. m. s.	m. s.	′ ″
Planet—Star *a*	21 53 26.4	+ 1 10.81	
	22 15 55.8		+ 10 41.02
Δ ρ . .		.00	— .47
Planet—Star *b*	21 53 26.4	— 0 49.82	
Assumed .	22 45 0		— 8 20.13
Δ ρ . .		.00	— .35
Planet—Star *c*	21 59 49.0	— 0 31.01	
Assumed .	22 35 0		+ 0 48.08
Δ ρ . .		.00	+ .03

Interrupted by clouds.

NOVEMBER 21—continued.

Object.	Chr. time of transit. I.	II.	III.	Mean of wires.	Mic.	Planet—Star. Δ *a*.	Δ mic.	Observer.
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*	M.
Star *a* .	42.0	54.5	7.0	22 27 54.50		+ 1 23.50		
Neptune	5.4	18.0	30.6	29 18.00				
Star *b* .	40.8	53.4	6.0	29 53.40		— 0 35.40		
Star *a* .	21.0	34.0	46.7	31 33.90		+ 1 23.50		
Neptune	45.0	57.2	10.0	32 57.40				
Star *b* .	20.0	33.0	45.2	33 32.73		— 0 35.33		
Star *a* .	59.0	11.0	23.8	37 11.27		+ 1 23.53		
Neptune	22.0	34.8	47.6	38 34.80				
Star *b* .	57.5	9.8	22.4	22 39 9.90		— 0 35.10		
Star *a* .				Time not noted.	3.29.160*		— 36.183	
Neptune					2.35.360			
Star *b* .					2.43.536		+ 8.176	
Star *a* .					3.28.960		— 36.188	
Neptune					2.35.165			
Star *b* .					2.43.300		+ 8.135	
Star *a* .					3.28.918		— 36.077	
Neptune					2.35.012			
Star *b* .					2.43.260		+ 8.248	
Star *a* .					3.28.650		— 36.195	
Neptune					2.34.862			
Star *b* .					2.43.125		+ 8.263	
Star *a* .					3.28.555		— 36.186	
Neptune					2.34.758			
Star *b* .					2.43.012		+ 8.254	

Results.

The inclination of the transit wires has been determin and the correction applied to Star *b*, as on Nov. 20. See of that date.

		m. s.	
Corr. of Chron. . . .		— 3 12.7	
	h. m. s.		° ′ ″
Star *a* . .	21 50 9.09		— 13 23 34.67
Star *b* . .	21 52 9.60		— 13 34 59.44
	Sid. time. h. m. s.	m. s.	′ ″
Planet—Star *a*			
Assumed .	22 50 0.0		— 9 17.1
Δ ρ			— .4
Planet—Star *b*	22 24 35.0	— 0 35.24	
Assumed .	22 50 0.0		+ 2 6.5
Δ ρ		.00	+ .1
Corr. for inc. of wires		— .23	

OBSERVATIONS OF DIAMETER OF NEPTUNE.

	2 Diam.		1 Diam.
39.890 40.180	0.290	39.872 39.990	0.118
39.780 40.202	0.422	39.892 39.980	0.088
39.820 40.210	0.390	39.848 39.951	0.103
39.885 40.188	0.303	39.715 39.886	0.171
39.864 40.230	0.366	39.785 39.906	0.121
	0.354	39.780 39.885	0.105
	0.177		0.118

Whence, diameter = 0r.145 = 2.″23.

NOVEMBER 28.

Object.	I.	II.	III.	Mean of wires.	Mic.	Δ *a*.	Δ mic.	Observer.
Star *a* .	55.7	8.6	21.3	23 5 8.53		+ 1 41.85		W.
Neptune			3.1	6 50.38				
Star *a* .	14.5	27.3	40.0	12 27.27		1 42.69		
Neptune	57.2	10.0		14 9.96				
Star *a* .	46.7	59.3	11.5	17 59.17		1 42.58		
Neptune	29.1		54.4	19 41.75				
Star *a* .	50.5	2.3	15.1	32 2.63		1 41.87		
Neptune	31.7	44.7	57.1	33 44.50				
Star *a* .	41.5	4.8	17.4	39 4.57	2.54.682	1 42.67	— 30.172	
Neptune	34.4	47.2	59.7	22 40 47.04	3.54.493			

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* Readings of scale not given ; they have been assumed as in the text.

NOVEMBER 28—continued.

t.	Chr. time of transit. I.	II.	III.	Mean of wires.	Mic.	Planet—Star. Δ *a*.	Δ mic.	Observer.	Results.
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*		
.	35.2	48.2	0.7	22 42 48.03	2.54.849	+ 1 42.54	— 30.186	W.	
ne	17.8	30.5	43.4	44 30.57	3.54.646				
.	42.7	55.3	7.7	47 55.23	2.55.318	+ 1 42.14	— 30.273		m. s. Corr. of Chron. . . . . — 3 28.4
ne	24.4	37.5	50.2	49 37.37	3.55.028				h. m. s. ° ′ ″
.	34.6	47.7	0.3	53 47.53	2.55.472	+ 1 42.74	— 30.061		Star *a* . . 21 50 9.00 — 13 23 35.06
ne	17.3	30.2	43.3	55 30.27	3.55.394				Sid time. h. m. s. m. s. ′ ″
.	52.3	4.4	17.5	57 4.73	2.56.457	+ 1 42.47	— 30.132		Planet—Star *a* 23 35 14.5 + 1 42.40 23 48 38.7 . — 7 44.99
ne	34.5	47.4	59.7	58 47.20	3.56.308				Δ ρ — .01 — .41
.	34.6	47.4	0.2	0 1 47.40	2.56.752	+ 1 42.67	— 30.271		
ne	17.4	30.0	42.8	0 3 30.07	3.56.464				

NOVEMBER 29.

t.	Chr. time of transit. I.	II.	III.	Mean of wires.	Mic.	Planet—Star. Δ *a*.	Δ mic.	Observer.	Results.
.	40.2	52.5	5.3	23 19 52.67	2.53.178	+ 1 45.08	— 29.184	W.	
ne	25.2		50.3	21 37.75	3.53.977				m. s.
.	2.7	15.2	27.4	30 15.10	2.54.564	+ 1 45.30	— 29.094		Corr. of Chron. . . . . — 3 31.7
ne	48.2	0.5	12.5	32 0.40	3.55.453				h. m. s. ° ′ ″ Star *a* . . 21 50 8.99 — 13 23 35.11 Star *b* . . 21 52 9.51 13 34 59.89
.	5.3	18.4	31.3	33 18.33	2.54.776	+ 1 45.61	— 29.191		Star *c* . . 21 51 50.69 — 13 25 52.76
ne		4.2	16.4	35 3.94	3.55.568				Sid time. h. m. s. m. s. ′ ″
.	12.8	25.2	37.8	37 25.27	2.54.875	+ 1 45.00	— 29.159		Planet—Star *a* 23 30 56.0 + 1 45.23 — 7 29.40
ne	57.7	10.5	22.6	39 10.27	3.55.699				Δ ρ .00 .39 Planet—Star *c* 0 42 45.0 5 9.28 Δ ρ — .27
.	28.1	42.3*	53.5	42 40.80	2.55.146	+ 1 45.15	— 29.223		
ne	13.4		38.5	23 44 25.95	3.55.906				Very high wind. Observations difficult.

Observation of position and distance of Neptune—Star *b* and Star *a*:

	h. m. s.	Position Vernier. ° ′ I.	° ′ II.	Micrometer. *Revs.*	Distance. *Revs.*
Star runs along mic. wire		272 38	92 38	2.38.938	
Transit wire joining Neptune and Star *b*	23 57 10	229 24	49 23	3.48.176	20.745
	0 2 30	228 51	48 50	3.48.088	20.833
Star *c*	0 10 20	262 25	82 24	3.48.282	20.639
	0 19 2	262 58	82 57	3.48.648	20.273
	0 24 16	261 58	81 56	3.48.182	20.739
	0 31 55	263 4	83 4	3.48.368	20.653

.					(38.938)			W.	
ne				0 42 50.	3.48.708		— 20.213		
ne				44 25.	3.48.812		20.109		
ne				45 22.	3.48.788		20.133		
ne				47 0.	3.48.916		20.105		
ne				48 48.	3.48.958		19.963		
ne				0 49 15.	5.48.992		— 19.929		

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* Rejected.

DECEMBER 3.

Object.	Chr. time of transit. I.	II.	III.	Mean of wires.	Mic.	Planet—Star. Δ *a*.	Δ mic.	Observer.	Results.
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*		
Star *a* .	34.2	48.2	59.8	22 30 47.40	2.41.724	+ 1 56.60	— 24.494	W.	
Star *c* .	15.4			32 28.13		+ 0 15.87			
Neptune	31.2	44.2	56.6	32 44.00	3.47.213				
Star *a* .	48.2	0.5	13.4	37 0.70	(38.948)	+ 1 58.60	— 24.493		
Star *c* .	30.2			38 42.93		+ 0 16.37			
Neptune	46.4	59.2	12.3	38 59.30	3.44.438				
Star *a* .	26.4	39.3	51.5	41 39.07	(38.948)	+ 1 58.26	— 24.469		
Star *c* .	8.3			43 21.03		+ 0 16.30			
Neptune	24.5	37.8	49.7	43 37.33	3.44.462				
Star *a* .	37.4	50.4	3.4	45 50.40	(38.948)	+ 1 58.40	— 24.426		
Star *c* .	20.5			47 33.23		+ 0 15.57			
Neptune	36.4	48.6	1.4	47 48.80	3.44.505				
Star *a* .	25.3	37.3	50.3	55 37.63	(38.948)	+ 1 58.25			
Star *c* .	6.6	19.7	32.3	57 19.53	2.29.934	+ 0 16.35			
Neptune			48.6	57 35.88					
Star *a* .	47.3	0.5	12.8	23 1 0.20	(38.948)	+ 1 58.68			
Star *c* .	29.6	42.3	54.7	2 42.20	2.29.894	+ 0 16.68			
Neptune			11.6	2 58.88					
Star *a* .	17.8	30.8	43.2	6 30.60	(38.948)	+ 1 57.78			
Star *c* .	59.8	12.3	24.5	8 12.20	2.29.913	+ 0 16.18			
Neptune			41.1	23 8 28.38					

			m. s.
Corr. of Chron. . . .			— 3 44.4
	h. m. s.		° ′
Star *a* . .	21 50 8.94		— 13 23 3
Star *c* . .	21 51 50.64		— 13 25 5
	Sid time. h. m. ″	m. s.	′
Planet—Star *a*	22 46 34.5	+ 1 58.08	
	22 37 3.0		— 6
Δ *ρ*		.00	—
Planet—Star *c*	22 46 34.5	+ 0 16.19	
Δ *ρ*		.00	

DECEMBER 9.

Object.	I.	II.	III.	Mean of wires.	Mic.	Δ *a*.	Δ mic.	Observer.	Results.
Star *a* .	28.3	41.2	53.6	23 10 41.03	(39.980)	+ 2 21.64		W.	
Star *c* .	10.1	22.3		12 22.56	2.30.042	+ 0 40.11			
Neptune	50.3	2.6	15.1	13 2.67					
Star *a* .	36.2	48.0	1.4	16 48.53	(38.980)	+ 2 22.10			
Star *c* .	18.7	30.6	42.3	18 30.53	2.30.076	+ 0 40.10			
Neptune	58.2	10.5	23.2	19 10.63					
Star *a* .	27.7	40.4	53.5	29 40.53	(38.980)	+ 2 21.87			
Star *c* .	10.4	22.3	35.2	31 22.63	2.30.042	+ 0 39.77			
Neptune	49.6	2.4	15.2	32 2.40					
Star *c* .	2.4	33.7	46.6	36 33.57	(38.980)	+ 0 39.63	— 7.588		
Neptune	0.7		25.7	37 13.20	2.31.392				
Star *c* .	53.4	6.3	18.4	41 6.03	(38.980)	+ 0 40.07	— 7.408		
Neptune	33.4	46.0	58.9	41 46.10	2.31.572				
Star *c* .	15.3	27.8	40.5	45 27.87	(38.980)	+ 0 39.76	— 7.398		
Neptune	54.6	7.7	20.6	23 46 7.63	2.31.582				

DECEMBER 9—continued.

ect.	Chr. time of transit. I.	II.	III.	Mean of wire.	Mic.	Planet—Star. Δ *a*.	Δ mic.	Observer.
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*	
c .	0.7	13.4	26.2	23 49 13.33	(38.980)	+ 0 40.34	— 7.451	W.
une	41.3	53.8	5.9	49 53.67	2.31.529			
c .	34.3	47.4	59.9	53 47.20	(38.980)	+ 0 40.17	— 7.382	
une	14.4	27.2	40.5	54 27.37	2.31.598			
c .	28.2	40.4	53.5	56 40.70	(38.980)	+ 0 40.20	— 7.545	
une	8.3	20.9	33.5	57 20.90	2.31.435			
c .	47.4	0.5	13.2	59 0.37	(38.980)	+ 0 40.23	— 7.508	
une	28.1	40.4	53.3	59 40.60	2.31.472			
c .	0.3	12.5	25.2	0 2 12.67	(38.980)	+ 0 40.06	— 7.446	
une	40.1	52.8	5.3	2 52.73	2.31.534			
c .	37.5	49.5*	2.4	4 49.80	(38.980)	+ 0 40.07	— 7.526	
une	17.5	29.7	42.4	5 29.87	2.31.545			
.	4.7	17.5	30.3	8 17.50	(38.980)	+ 0 40.13	+ 7.392	
une	45.2	57.4	10.3	8 57.63	2.31.588			
une				9 30	2.31.548		— 7.432	
une				0 10 0	2.31.612		— 7.368	

Results.

		m. s.
Corr. of Chron.		— 3 58.9.
	h. m. s.	° ′ ″
Star *a* . .	21 50 8.86	— 13 23 35.65
Star *b* . .	21 52 9.37	13 35 0.43
Star *c* . .	21 51 50.56	— 13 25 53.30

	Sid. time. h. m. s.	m. s.		′ ″
Planet—Star *a*	23 17 26.3	+ 2 21.87		
Δ ρ . .		.00		
Planet—Star *c*	23 42 19.9	+ 0 40.05		
	47 57.7		—	1 54.84
Δ ρ . .		.00	—	.10

OBSERVATION OF DIAMETER OF NEPTUNE.

I Limb.	II Limb.	2 Diam.
r	r	r
38.873	39.152	0.279
38.873	39.168	0.295

Whence Diameter . . = 0 14.35 r = 2.21″

Observation of position and distance of Neptune—Star *b* and Star *c* :

	h. m. s.	Position Vernier. I. ° ′	II. ° ′	Micrometer. *Revs.*
Star runs along mic. wire		272 38		(38.980)
Transit wire joining Neptune and Star *c*	0 30 20	163 31	343 30	3.29.677
	35 20	163 7		3.29.488
Star *b*	41 15	245 39	65 38	3.29.828
	45 15	245 37	65.35	3.30.146

DECEMBER 12.

ect.	I.	II.	III.	Mean of wire.	Mic.	Δ *a*.	Δ mic.	Observer.
.	50.2	2.5	15.3	23 49 2.67	(38.990)	+ 2 34.26	— 11.840	W.
.	31.5	44.4	57.1	50 44.33	2.30.064	+ 0 52.60	— 2.914	
ne	24.8	36.5	49.5	51 36.93	2.27.150			
.	52.3	4.4	17.1	56 4.60	(38.990)	+ 2 35.47	— 11.855	
.	34.3	46.6	59.3	57 46.73	2.30.075	+ 0 53.34	— 2.940	
ne	27.7	40.1	52.4	58 40.07	2.27.135			
.	27.4	40.4	52.8	0 2 40.20	(38.990)	+ 2 35.33		
.	9.3			4 22.03	2.30.113	+ 0 53.50		
ne	2.8	15.4	28.4	5 15.53				
.	39.3	51.7	4.5	7 51.83	(38.990)	+ 2 36.00	— 11.812	
.	21.3	33.7	45.6	9 33.53	2.30.038	+ 0 54.30	— 2.860	
ne	15.3	27.7	40.5	0 10 27.83	2.27.178			

		m. s.
Corr. of Chron.		— 4 3.6
	h. m. s.	° ′ ″
Star *a* . . .	21 50 8.83	— 13 23 35.81
Star *c* . . .	21 51 50.53	— 13 25 53.46

	Sid. time. h. m. s.	m. s.		′ ″
Planet—Star *a*	0 3 29.8	+ 3 35.00	—	3 1.97
Δ ρ		.00	—	.16
Planet—Star *c*	0 3 29.8	+ 0 53.65	—	0 43.69
Δ ρ		.00	—	.04

*Recorded 50.5.

December 12—continued.

Object.	Chr. time of transit.			Mean of wires.	Mic.	Planet—Star.		Observer.	Results.
	I.	II.	III.			Δ α.	Δ mic.		
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*		
Star *a* .	56.5	9.2	21.4	0 14 9.03	(38.990)	+ 2 33.87	— 11.695	W.	
Star *c* .	35.4	48.3	1.4	15 48.37	2.29.932	+ 0 54.53	— 2.637		
Neptune	30.6	42.8*	55.3	16 42.90	2.27.295				
Star *a* .	50.3	2.4	14.4	20 2.37	(38.990)	+ 2 35.06	— 11.852		
Star *c* .	31.2	43.7	56.5	21 43.80	2.29.968	+ 0 53.63	— 2.830		
Neptune	24.5	37.3	50.5	0 22 37.43	2.27.138				

December 13.

Star *a* .	6.7	19.1	31.7	0 12 19.17	(38.980)	+ 2 39.33	— 10.026	W.
Star *c* .	47.4	0.3	13.4	14 0.37		+ 0 58.13		
Neptune	45.4	58.7	11.4	14 58.50	2.28.954†			
Star *a* .	54.3	6.7	19.4	19 6.80	(38.980)	+ 2 39.90	— 10.168	
Star *c* .	35.8	49.1	1.4	20 48.77	2.29.910	+ 0 57.93	— 1.098	
Neptune	34.3	46.4	59.4	21 46.70	2.28.812			
Star *a* .	13.4	24.4	37.5	30 25.10	(38.980)	+ 2 39.67	— 10.082	
Star *c* .		6.5	19.3	32 6.54	2.30.022	+ 0 58.23	— 1.124	
Neptune	52.3	4.6	17.4	33 4.77	2.28.898			
Star *a* .	0.6	13.4	25.7	36 13.23	(38.980)	+ 2 39.94	— 9.982	
Star *c* .		54.6	7.4	37 54.64	2.29.932	+ 0 58.53	— 0.934	
Neptune	40.5	53.3	5.7	38 53.17	2.28.898			
Star *a* .	30.5	43.4	55.9	41 43.27	(38.980)	+ 2 39.92	— 10.148	
Star *c* .			38.0	43 25.28	2.29.979	+ 0 57.91	— 1.147	
Neptune		23.5	35.6	44 23.19	2.28.832			
Star *a* .	40.6	52.4	4.6	48 52.53	(38.980)	+ 2 40.04	— 10.428	
Star *c* .	21.2	33.8	46.6	50 33.87	2.30.054	+ 0 58.70	— 1.202	
Neptune	20.3	32.6	44.8	51 32.57	2.28.852			
Star *a* .	26.8	39.7	51.7	53 39.40	(38.980)	+ 2 39.97	— 10.019	
Star *c* .	9.2	21.1	33.9	55 21.40	2.30.034	+ 0 57.97	— 1.073	
Neptune	6.5	19.2	32.4	56 19.37	2.28.961			
Star *a* .	56.6	9.1‡	21.9	1 0 9.20	(38.980)	+ 2 40.60	— 10.007	
Star *c* .	40.1	51.6	4.1	1 51.93	2.30.056	+ 0 57.87	— 1.083	
Neptune	37.2	49.9	2.3	2 49.80	2.28.973			
Star *a* .	2.6	15.6	27.5	7 15.23	(38.980)	+ 2 40.37	— 10.038	
Star *c* .	44.4	56.9	9.8	8 57.03	2.29.952	+ 0 58.57	— 1.010	
Neptune	42.8		8.4	1 9 55.60	2.28.942			

			m. s.
Corr. of Chron. . . .			4 6.8
	h. m. s.		° '
Star *a* . .	21 50 8.82		— 13 23 3
Star *c* . .	21 51 50.52		— 13 25 5
	Sid. time.		
	h. m. s.	m. s.	'
Planet—Star *a*	0 39 38.1	+ 2 39.97	— 2
Δ ρ		.00	
Planet—Star *c*	0 39 38.1	+ 0 58.20	— 0
Δ ρ		.00	—

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* Recorded 41.8. † Recorded 33*r*. throughout. ‡ Recorded 10.1.

DECEMBER 15.

bject.	Chr. time of transit.			Mean of wires.	Mic.	Planet—Star.		Observer.	Results.
	I.	II.	III.			Δ a.	Δ mic.		
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*		
r *a* .	6.7	19.6	31.4	1 15 19.23	(39.041)	+ 2 49.94	— 6.735	W.	
r *c* .	48.4	1.3	13.7	17 1.13		+ 1 8.04			
ptune	56.5	9.2	21.8	18 9.17	2.32.306				
r *a* .	19.3	31.7	44.4	20 31.80	(39.041)	+ 2 50.23	— 6.898		
r *c* .	1.3	13.9	26.5	22 13.90	2.29.998	+ 1 8.13	+ 2.145		
ptune	9.4	22.2	34.5	23 22.03	2.32.143				
r *a* .	10.2	22.7	35.4	26 22.77	(39.041)	+ 2 50.13	— 6.605		
r *c* .	52.4	4.3	17.2	28 4.63	2.30.023	+ 1 8.27	+ 2.413		
ptune	0.8	12.5	25.4	29 12.90	2.32.436				
ir *a* .	52.2	4.6	17.5	32 4.77	(39.041)	+ 2 50.16	— 6.669		
ir *c* .	34.2	46.9	0.0	33 47.03	2.30.082	+ 1 7.90	+ 2.290		
ptune	42.4	54.9	7.5	34 54.93	2.32.372				
ir *a* .	15.3	27.4	40.6	37 27.77	(39.041)	+ 2 50.00			
ir *c* .	56.8	9.7	21.7	39 9.40	2.29.992	+ 1 8.37			
ptune	5.3	17.8	30.2	1 40 17.77					

		m. s.
Corr. of Chron. . . .		— 4 13.8
	h. m. s.	° ′ ″
Star *a* . .	21 50 8.80	— 13 23 35.95
Star *c* . .	21 51 50.50	— 13 25 53.60

	Sid. time. h. m. s.	m. s.	′ ″
Planet—Star *a*	1 24 57.6	+ 2 50.09	— 1 43.64
Δ ρ		— .01	— .17
Planet—Star *c*	1 24 57.6	+ 1 8.14	+ 0 35.17
Δ ρ		.00	+ .06

DECEMBER 19.

ir *a* .	52.4	4.5	17.3	0 10 4.73	2.47.828	+ 3 10.24	+ 0.394	W.	
ir *c* .	33.7	46.4	58.2	11 46.10	2.39.022	+ 1 28.87	+ 9.200		
ptune	2.3	15.2	27.4	13 14.97	2.48.222				
ir *a* .	55.4	8.1	20.5	18 8.00	2.48.026	+ 3 10.15	+ 0.350		
ir *c* .	37.3	50.4	2.6	19 50.10	(39.036)	+ 1 28.05	+ 9.340		
ptune	5.4		30.9	21 18.15	2.48.376				
ir *a* .	7.2	19.9	32.2	24 19.77	2.48.042	+ 3 9.96	+ 0.350		
ir *c* .	48.7	1.5	14.2	26 1.47	(39.036)	+ 1 28.26	+ 9.356		
ptune	17.4	29.4	42.4	27 29.73	2.48.392				
ir *a* .	44.6	57.4	10.1	29 57.37	2.48.367	+ 3 10.26			
ir *c* .	26.6	39.4	52.5	31 39.50	(39.036)	+ 1 28.13			
ptune	54.8	7.6	20.5	33 7.63					
ir *a* .	21.2	33.7	46.6	36 33.83	2.48.192	+ 3 10.20	+ 0.477		
ir *c* .	2.7	15.4	27.8	38 15.30	(39.036)	+ 1 28.73	+ 9.633		
ptune	31.5	43.8	56.8	39 44.03	2.48.669				
ir *a* .	37.5	50.3	2.4	42 50.07	2.47.692	+ 3 10.60	+ 0.361		
ir *c* .	19.3	31.8	44.2	44 31.77	(39.036)	+ 1 28.90	+ 9.017		
ptune	48.2	0.5	13.3	66 0.67	2.48.053				
ir *a* .				1 10 14.5	2.39.798		+ 0.551		
ptune					2.40.349				
ir *a* .				1 15 6.5	2.40.179		+ 0.482		
ptune					2.40.661				

		m. s.
Corr. of Chron. . . .		— 4 28.0
	h. m. s.	° ′ ″
Star *a* . .	21 50 8.76	— 13 23 36.12
Star *c* . .	21 51 50.46	— 13 25 53.77

	Sid. time. h. m. s.	m. s.	′ ″
Planet—Star *a*	0 25 41.2	+ 3 10.23	
	0 37 24.6		+ 0 6.56
Δ ρ		.00	.00
Planet—Star *b*	0 25 41.2	+ 1 28.49	+ 2 23.41
Δ ρ		.00	+ .15

December 20.

Object.	Chr. time of transit.			Mean of wires.	Mic.	Planet—Star.		Observer.
	I.	II.	III.			Δ α.	Δ mic.	
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*	
Star α .	12.5	25.4	38.2	23 58 25.37	2.48.048	+ 3 15.80	+ 2.279	W.
Star c .	54.4	7.1	20.2	0 0 7.23	(39.018)	+ 1 33.94	+ 11.309	
Neptune	28.5	41.3	53.7	1 41.17	2.50.327			
Star α .	54.4	7.2	20.5	5 7.37	2.47.088	+ 3 15.66	+ 1.960	
Star c .	36.2	49.4	1.6	6 49.07		+ 1 33.96		
Neptune	10.3	23.3	35.5	8 23.03	2.49.048			
Star α .	37.4	50.8	3.3	11 50.50	2.48.014	+ 3 15.87	+ 2.367	
Star c .	20.4	32.4	44.6	13 32.47	(39.018)	+ 1 33.90	+ 11.363	
Neptune	53.5	6.4	19.2	15 6.37	2.50.381			
Star α .	2.2	14.8	27.4	19 14.80	3.47.988	+ 3 15.83	+ 2.415	
Star c .	44.1		9.2	20 56.65	(39.018)	+ 1 33.98	+ 11.385	
Neptune	17.9	30.5	43.5	22 30.63	2.50.403			
Star α .	35.3	48.1	0.5	24 47.97	2.48.029*	+ 3 15.56	+ 2.351	
Star c .	17.1	30.0	42.5	26 29.87	(39.018)	+ 1 33.66	+ 11.362	
Neptune	51.3	3.5	15.8	28 3.53	2.50.380			
Star α .	34.3	46.5	59.9	31 46.90	2.48.048	+ 3 15.90	+ 2.400	
Star c .	15.4	28.7	41.2	33 28.43	(39.018)	+ 1 34.37	+ 11.430	
Neptune	50.6	2.5	15.3	35 2.80	2.50.448			
Star α .	36.5	49.2	2.3	37 49.33	2.47.853	+ 3 15.64	+ 2.271	
Star c .	18.5	30.8	42.8	39 30.70	(39.018)	+ 1 34.27	+ 11.106	
Neptune	52.3	5.0	17.6	41 4.97	2.50.124			
Star α .	40.4	52.4	5.2	44 52.67	2.47.684	+ 3 15.63	+ 2.220	
Star c .	21.3	34.3	46.8	46 34.13	(39.018)	+ 1 34.17	+ 10.886	
Neptune	55.8	8.2	20.9	0 48 8.30	2.49.904			

Results.

Observations of Diameter of Neptune.

I Limb.	II Limb.	2 Diam.
r	r	r
40.251	39.806	0.445
40.242	39.788	0.454

Whence Diameter . . = 0.225 r =

	m. s.
Corr. of Chron.	— 4 30.4

	h. m. s.	° ′
Star α . .	21 50 8.75	— 13 23 3
Star c . .	21 51 50.46	— 13 25 5

	Sid. time. h. m. s.	m. s.		′
Planet—Star α	0 20 29.7	+ 3 15.76	+	0
Δ ρ		.00	+	
Planet—Star c	0 20 29.7	+ 1 34.03	+	2
Δ ρ		.00	+	

December 23.

Object.	I.	II.	III.	Mean of wires.	Mic.	Δ α.	Δ mic.	Observer.
Star α .	27.3	40.2	52.3	0 12 39.93	(38.975)	+ 3 32.60	+ 8.028	W.
Star c .	9.3	21.3	34.4	14 21.67		+ 1 50.86		
Neptune	0.2	12.3	25.1	16 12.53	2.47.003			
Star α .	33.5	45.7	58.4	19 45.87	(38.975)	+ 3 33.03		
Star c .	15.2	28.0	40.5	21 27.90		+ 1 51.00		
Neptune	6.2	19.2	31.3	23 18.90				
Star α .	13.3	25.5	38.7	33 25.83	(38.975)	+ 3 33.14	+ 8.357	
Star c .	54.9	7.8	20.6	35 7.77		+ 1 51.20		
Neptune	46.2	59.3	11.4	36 58.97	2.47.332			
Star α .	33.2	46.3	59.2	39 46.23	(38.975)	+ 3 32.90	+ 8.211	
Star c .	15.5	28.3	41.3	41 28.37		+ 1 50.76		
Neptune	6.5	19.3	31.6	0 43 19.13	2.47.186			

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* Recorded 50r.

DECEMBER 22—continued.

ect.	Chr. time of transit.			Mean of wires.	Mic.	Planet—Star.		Observer.	Results.
	I.	II.	III.			Δ α	Δ mic.		
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*		
a .	30.9	43.4	56.4	0 45 43.57	(38.975)	+ 3 32.96	+ 8.251	W.	m. s. Corr. of Chron. . . . . — 4 42.0. h. m. s. ° ′ ″ Star *a* . . 21 50 8.72 — 18 23 36.30 Star *c* . . 21 51 50.43 13 25 53.95 Sid. time. h. m. s. m. s. ′ ″ Planet—Star *a* 0 43 7.2 + 3 33.08 + 2 6.22 Δ ρ . . .00 + .12 Planet—Star *c* 0 43 7.2 + 1 51.10 Δ ρ . . + .01
c .	12.4	25.3	38.6	47 25.43		+ 1 51.10			
une	3.6	16.7	29.3	49 16.53	2.47.226				
.	6.3	19.2	31.5	52 19.00	(38.975)	+ 3 33.57	+ 8.144		
.	48.5	1.4	13.7	54 1.20		+ 1 51.37			
une	39.7	52.4	5.6	55 52.57	2.47.119				
.	58.2	11.3	23.4	1 12 10.97	(38.975)	+ 3 33.36	+ 8.247		
.	40.3	53.2	5.4	13 52.97		+ 1 51.36			
une	31.4	44.4	57.2	15 44.33	2.47.222				
.	4.6	17.4	30.1	18 17.37	(38.975)	+ 3 33.10	+ 8.113		
.	46.7	59.4	11.9	19 59.33		+ 1 51.14			
une	37.9	50.7	2.8	1 21 50.47	2.47.088				

DECEMBER 26.

ect.	I.	II.	III.	Mean of wires.	Mic.	Δ α	Δ mic.	Observer.	Results.
.	30.6	43.4	55.6	23 59 43.20	(38.970)	+ 3 51.13	+ 14.261	W.	m. s. Corr. of Chron. . . . . — 4 53.0 h. m. s. ° ′ ″ Star *a* . . 21 50 8.70 — 13 23 36.40 Star *c* . . 21 51 50.41 — 13 25 54.05 Sid. time. h. m. s. m. s. ′ ″ Planet—Star *a* 0 36 25.3 + 3 50.85 0 24 53.9 + 3 39.87 Δ ρ . . + .01 + .22 Planet—Star *c* 0 36 25.3 + 2 9.01 Δ ρ . . .02
.	12.4	25.3	37.7	0 1 25.13		+ 2 9.20			
une	22.2	34.4	46.4	3 34.33	2.53.231				
.	19.4	32.1	44.6	7 32.03	(38.970)	+ 3 50.80	+ 14.146		
.	1.1	13.8	26.2	9 13.70		+ 2 9.13			
une	10.3	22.8	35.4	11 22.83	2.53.116				
.	42.5	55.5	8.4	14 55.47	(38.970)	+ 3 50.86	+ 14.144		
.	24.9	37.5	50.2	16 37.53		+ 2 8.80			
une	33.5	46.5	59.0	18 46.33	2.53.114				
.	26.5	39.5	52.1	21 39.37	(38.970)	+ 3 50.66	+ 14.368		
.	8.4	21.1	34.3	23 21.27		+ 2 8.76			
une	17.3	30.3	42.5	25 30.03	2.53.338				
.	11.5	24.7	37.4	27 24.53	(38.970)	+ 3 50.84	+ 14.212		
.	53.9	6.4	19.3	29 6.53		+ 2 8.84			
une	2.6	15.3	28.2	31 15.37	2.53.182				
.	59.1	11.8	24.3	34 11.73	(38.970)	+ 3 50.57	+ 14.358		
.	40.7	53.4	5.8	35 53.30		+ 2 9.00			
une	49.4	2.4	15.1	38 2.30	2.53.328				
.	42.5	55.5	8.4	47 55.47	(38.970)	+ 3 51.16	+ 14.413		
.		37.7		49 37.70		+ 2 8.93			
ne	34.3	46.5	59.1	51 46.63	2.53.383				
.	53.5	6.7	18.8	54 6.33	(38.970)	+ 3 50.77	+ 14.274		
.	35.3	47.9	0.4	55 47.87		+ 2 9.23			
ne	44.3	56.5	10.5	0 57 57.10	2.53.244				

December 26—continued.

Object.	Chr. time of transit.			Mean of wires.	Mic.	Planet—Star.		Observer.	Results.
	I.	II.	III.			Δ a	Δ mic.		
	s.	s.	s.	h. m. s.	*Revs.*	m. s.	*Revs.*		
Star a .	29.1	41.4	54.2	1 1 41.57	(38.970)	+ 3 50.63		W.	
Star c .	10.8	23.4	36.1	3 23.43	2.29.928	+ 2 8.77			
Neptune	19.2	32.5	44.9	5 32.20					
Star a .	2.3	15.4	27.4	8 15.03	(38.970)	+ 3 50.64			
Star c .	44.4	56.2	9.4	9 56.67	2.29.924	+ 2 9.00			
Neptune	53.1	5.5	18.4	12 5.67					
Star a .	24.8	37.4	50.2	14 37.47	(38.970)	+ 3 51.26			
Star c .	6.5	19.2	32.2	16 19.30	2.29.986	+ 2 9.43			
Neptune	15.9	28.9	41.4	18 28.73					

December 30.

Object.	I.	II.	III.	Mean of wires.	Mic.	Δ a	Δ mic.	Observer.	Results.
Star a .	5.0	17.5	30.2	1 12 17.57	(39.048)	+ 4 15.83	+ 22.937	H.	m. s. Corr. of Chron. . . . — 5 6.0. h. m. s. ° ′ Star a . . 21 50 8.67 — 13 23 3
Neptune	20.8	33.3	46.1	16 33.40	2.61.985				
Star a .	15.0	28.0	40.5	18 27.83	(39.048)	+ 4 15.84	+ 23.042		Sid. time. h. m. s. m. s. ′ Planet—Star a 1 14 32.5 + 4 15.84 + 5 Δ ρ . . + .03 +
Neptune	31.0	43.8	56.3	1 22 43.67	2.62.090				

OBSERVATIONS OF CUSPS, &c., DURING THE SOLAR ECLIPSE OF APRIL 24-5, 1846.

n the following observations the image of the field of view was projected n a screen, affording a better mode of observing than any other. The s of transit were noted by Lieutenant MAYNARD, and the micrometer obtions made by Lieutenant MAURY. The series was frequently interrupted ouds and the entrance of visiters. For the observed times of beginning lipse, see p. 359.

NOTE. + on mic. scale corresponds to — in declination. Micrometer 2 = wire 3 — 29*r*.983 = wire 1 + 29*r*.987.

bject.	Chron. times of transit.			Mean of wires.	Micrometer.
	I.	II.	III.		
	s.	s.	s.	h. m. s.	*Revs.*
A . .		50.6		3 2 50.60	3.25.710
B . .		14.3		4 14.30	2.39.044
A . .	43.1	56.6	9.5	6 56.07	3.23.010
B . .	49.6	2.8	15.4	9 2.60	2.38.435
A . .	55.1	8.0	20.8	27 7.97	3.34.408
B . .	41.8	54.6	7.6	38 54.67	2.36.228
A . .	38.3	51.0	3.9	40 51.07	1.36.064
B . .	29.5	42.2	55.4	42 42.37	2.36.888
A . .	27.8	40.5	53.0	43 40.43	2.22.350
B . .	20.0	33.0	46.0	45 33.00	1.14.242
A . .	28.4	40.9	53.4	46 40.90	1.25.364
B . .	23.2	36.0	49.3	48 36.17	2.39.692
A . .	2.8	15.7	27.9	50 15.47	3.58.210
B . .	0.8	13.6	26.4	52 13.60	Lost.
A . .	48.4	0.8	14.3	54 1.17	2.38.762
B . .	47.4	0.3	13.0	56 0.23	2.35.615
A . .	52.0	4.8	17.3	57 4.70	2.42.202
B . .	51.8	4.7	17.6	59 4.70	2.30.434
A . .	2.0	14.9	27.7	4 0 14.87	2.45.708
B . .	1.0	14.0	27.0	2 14.00	3.54.847
A . .	15.6	28.6	41.0	3 28.40	2.49.498
B . .	12.8	25.5	38.2	5 25.50	3.49.017
, U. L. .	Position	Vernier	70° 8′		2.39.097
U. L. .				9 25.0	3.19.958
U. L. .				11 49.0	3.19.958
U. L. .				12 33.0	3.19.740
	Position	restored.			
I. L. .	54.0	6.6	19.0	19 6.53	
A . .	28.0	40.9		19 40.80	
I. L. . .	46.0	58.5	11.1	20 58.53	
A . .	23.4	36.5		21 36.30	1.41.614
B . .	52.5	5.4	17.9	23 5.27	3.25.872
I. L. .	35.7	45.9	58.5	24 45.97	
A . .	17.2	30.2	43.2	25 30.20	
B . .	38.9	51.2	3.9	26 51.33	
I. L. .	28.4	41.0	53.7	32 41.03	
B . .	31.3	43.9	56.4	34 43.87	
I. L. .	28.3	40.8	53.6	40 40.90	
, I. L. .	30.5	43.4	55.8	41 43.23	
B . .	29.1		54.5	42 41.79	
I. L. .	49.0	1.8	14.6	44 1.80	
, I. L. .	56.0	8.9	21.5	45 8.80	
B . .		2.5	15.1	46 2.45	
I. L. .	32.3	45.0	57.9	53 45.07	
, I. L. .	52.2	5.0	18.3	55 5.17	
A . .	2.3	15.2	28.2	4 55 15.23	

APRIL 24-5—continued.

Object.	Chron. times of transit.			Mean of wires.	Micrometer.
	I.	II.	III.		
	s.	s.	s.	h. m. s.	*Revs.*
Sun, I. L. .	19.5	32.0	44.5	4 56 32.00	
Moon, I. L. .	42.8	55.4	7.8	57 55.33	
Cusp A . .	52.5	5.5	18.5	58 5.50	
Sun, I. L. .	38.2	51.0	3.8	5 0 51.00	
Moon, I. L. .	7.8	20.5	33.4	2 20.57	
Cusp A . .	17.5	30.5	43.5	2 30.50	
Sun, I. L. .	25.9	38.6	51.2	4 38.57	
Moon, I. L. .	0.7	13.5	26.7	6 13.63	
Cusp A . .	9.4	22.3	35.3	6 22.33	
Cusp B . .			52.8	6 40.09	
Sun, I. L. .	10.4	22.8	35.6	8 22.93	
Moon, I. L. .	48.0	1.0	14.0	10 1.00	
Cusp A . .	56.0	9.0	21.8	10 8.93	
Cusp B . .			36.0	10 23.29	
Sun, I. L. .	4.0	16.6	29.5	18 16.70	
Moon, I. L. .	57.5	10.2	23.0	20 10.23	
Cusp A . .	2.2	15.1	28.0	5 20 15.10	

Clouds prevented farther observations.

	h.		h. m. s.
Corr. of Chron. at	2	chron. time =	— 4 12 39.33
	6	" "	38.31

7. OBSERVATION OF TRANSITS OF SUN'S DIAMETER, BY LIEUTENANT MAYNARD.

These observations were made in the same manner as the Cusp observations of April 24-5.

MAY 19.

Limb.	Chron. times of transit.			Mean of wires.	Diam. of Sun.
	I.	II.	III.		
	s.	s.	s.	h. m. s.	m. s.
I	46.5	59.6	27.5	5 34 59.47	2 14 80
II	1.1	14.2	12.6	37 14.27	
I	22.8	36.0	49.0	38 35.93	14.84
II	37.7	50.7	3.9	40 50.77	
I	59.5	12.4	25.5	43 12.47	14.60
II	14.0	27.0	40.2	45 27.07	
I	28.2	42.0	55.0	45 41.73	15.37
II	44.0	57.1	10.2	47 57.10	
I	30.0	43.1	56.2	50 43.10	15.13
II	45.1	58.3	11.3	52 58.23	
I	24.0	37.5	50.2	54 37.23	15.14
II	39.0	52.3	5.8	56 52.37	
I	12.8	25.0	38.6	59 25.47	15.33
II	27.6	40.8	54.0	6 1 40.80	
I	48.8	2.2	15.4	8 2.13	14.77
II	3.7	17.0	30.0	10 16.90	
I	52.0	5.2	19.0	11 5.40	15.13
II	7.4	20.5	33.7	13 20.53	
I	52.0	5.5	18.6	14 5.37	14.73
II	7.0	20.1	33.2	16 20.10	
I	20.1	33.0	46.1	17 33.07	2 14.70
II	34.7	47.7	0.9	6 19 47.77	

8. Observations of Transits of Moon's Diameter, at Full Moon.

July 8.

In the observations of this date the micrometer was turned 90°, the position verniers now reading I. 182° 31′, II. 2° 30′, and the observer (Mr. Walker) noted the times of transit over the fixed and micrometer wires.

Wire.	Chron. times of transit. I Limb.	Chron. times of transit. II Limb.	Diam.	Wire.	Chron. times of transit. I Limb.	Chron. times of transit. II Limb.	Diam.
	h. m. s.	m. s.	m. s.		h. m. s.	m. s.	m. s.
I .	17 29 18.3	31 44.4	2 26.1	Fix.	18 32 37.7	35 3.1	25.4
Fix.	29 34.2	32 0.2	26.0	II .	32 54.4	35 20.0	25.6
II .	29 51.5	32 17.1	25.6	III .	33 27.9	35 53.5	25.6
III .	30 24.4	32 50.9	26.5	I .	44 0.1	46 25.4	25.3
I .	35 27.6	37 53.3	25.7	Fix.	44 16.4	46 41.9‖	25.5
II .	36 1.2	38 26.3	25.1	II .	44 33.2	46 58.5	25.3
III .	36 34.4	39 0.0	25.6	III .	45 6.1	47 32.1	26.0
I .	40 56.6	43 22.2	25.6	I .	48 36.6	51 1.7	25.1
Fix.	41 3.2	43 39.2	26.0	Fix.	48 53.0	51 18.1	25.1
II .	41 30.2	43 55.5	25.3	II .	49 9.7	51 34.9	25.2
III .	42 3.6	44 29.0	25.4	III .	49 43.2	52 8.8	25.6
I .	45 54.6	48 20.3	25.7	I .	54 25.8	56 50.2	24.4
Fix.	46 11.2	48 36.7*	25.5	Fix.	54 42.2	57 7.0	24.8
II .	46 28.2	48 53.5†	25.3	II .	54 58.7	57 23.8	25.1
III .	47 1.2	49 27.1	25.9	III .	55 31.9	57 57.1	25.2
I .	52 27.5	54 53.5	26.0	I .	57 53.8	60 19.2	25.4
Fix.	52 44.2	55 9.4	25.2	Fix.	58 10.4	60 35.5	25.1
II .	53 1.0	55 26.2	25.2	II .	58 26.5	60 52.3	25.8
III .	53 34.4	55 59.8	25.4	III .	59 0.3	61 25.4	25.1
I .	18 1 5.8	3 31.2	25.4	I .	19 47 9.6	49 44.6	25.0
II .	1 39.3	4 4.6	25.3	Fix.	47 36.2	50 1.2	25.0
III .	2 12.7	4 38.2	25.5	II .	47 52.8	50 17.9	25.1
I .	8 34.2‡	10 59.5	25.3	III .	48 26.2	50 51.1	24.9
Fix.	8 51.3	11 16.4	25.1	I .	52 2.2	54 27.2	25.0
II .	9 8.1	11 33.5	25.4	Fix.	52 18.7	54 43.8	25.1
III .	9 41.1	12 6.8	25.7	II .	52 35.5	55 0.7	25.2
I .	15 6.9	17 33.4	25.5	III .	53 8.7	55 33.8	28.1
II .	15 40.4	18 5.7	25.3	I .	57 47.4	60 12.0	24.6
III .	16 13.8	18 39.0	25.2	Fix.	58 3.4	60 28.7	25.3
I .	19 54.9	22 20.2	25.3	II .	58 20.3	60 45.6	25.3
Fix.	20 11.4	22 36.4	25.0	III .	58 53.7	61 18.8	25.1
II .	20 28.3	22 53.5	25.2	I .	20 2 14.0	4 39.5	25.5
III .	21 1.8	23 27.0	25.2	Fix.	2 30.6	4 55.9	25.3
I .	26 58.0	29 23.5	25.5	III .	3 20.6	5 46.0	25.4
Fix.	27 14.3	29 40.1	25.8	I .	6 56.7	9 21.6	24.9
II .	27 31.1	29 56.8	25.7	Fix.	7 13.0	9 37.6	24.6
III .	28 4.4	30 30.2	25.8	II .	20 7 30.0	9 54.6	2 24.6
I .	18 32 21.2	34 46.4	25.1				

Corr. of Chron. . . . . + 8.0 s.

* Recorded 37.7. † Recorded 42.5. ‡ Recorded 35.2. ‖ Recorded 6.9.

August 6.

Limb.	Chron. times of transit. I.	Chron. times of transit. II.	Chron. times of transit. III.	Mean of wires.	Diameter.
	s.	s.	s.	h. m. s.	m. s.
I . .	13.8	45.8	18.2	21 36 45.93	2 22.40
II . .	36.0	8.7	40.3	39 8.33	
I . .	17.0	49.8	21.8	40 49.53	22.44
II . .	39.6	11.9	44.4	43 11.97	
I . .	59.8	31.7	4.1	45 31.87	22.60
II . .	22.0	54.6	26.8	47 54.47	
I . .	7.1	39.9	12.0	49 39.67	22.66
II . .	29.9	2.3	34.8	52 2.33	
I . .	42.5	14.9	47.2	54 14.87	22.70
II . .	5.1	37.6	10.0	56 37.57	
I . .	36.3	8.7	41.4	58 8.80	22.70
II . .	59.1	31.6	3.8	22 0 31.50	
I . .	36.6	8.8	41.0	3 8.80	22.63
II . .	59.0	31.5	3.8	5 31.43	
I . .	57.0	29.5	1.8	7 29.43	22.77
II . .	19.8	52.2	24.6	9 52.20	
I . .	0.0	32.2	4.8	11 32.33	22.97
II . .	22.6	55.4	27.9	13 52.30	
I . .	22.0	54.6	27.0	16 54.53	22.67
II . .	44.8	17.0	49.8	19 17.20	
I . .	15.7	47.6	20.2	23 10 47.83	22.64
II . .	38.1	10.5	42.8	13 10.47	
I . .	13.5	45.6	18.3	14 45.80	22.40
II . .	35.5	8.3	40.8	17 8.20	
I . .	48.8	20.8	53.6	19 21.07	22.46
II . .	11.0	43.6	16.0	21 43.53	
I . .	45.2	18.1	50.8	23 18.03	22.74
II . .	8.2	40.8	13.3	25 40.77	
I . .	40.0	12.2	44.8	27 12.33	22.27
II . .	2.1	34.7	7.0	29 34.60	
I . .	32.7	5.7	38.0	31 5.47	22.83
II . .	55.8	28.2	0.8	33 28.30	
I . .	21.8	54.4	26.8	34 54.33	22.84
II . .	44.5	17.0	50.0	37 17.17	
I . .	23.1	55.9	28.5	39 55.83	22.57
II . .	45.8	18.4	51.0	42 18.40	
I . .	7.2	39.9	12.5	43 39.87	22.46
II . .	29.8	2.2	35.0	46 2.33	
I . .	51.3	23.5	55.8	47 23.53	2 22.60
II . .	13.5	46.2	18.7	23 49 46.13	

Corr. of Chron. . . . . . 24.0 s.

OBSERVATIONS OF OCCULTATIONS, &c. IN 1846.

1. OCCULTATIONS.

ate.	Star.	Phase.	Chron. time.	Mean Time Washington.	Observer.	Instrument.
			h. m. s.	h. m. s.		
h 31	Tauri, (1493)	Immersion	4 35 55.0	10 28 33.9	Mr. Shields	Comet Searcher
11	Scorpii, (5383)	Immersion	11 59 53.0	8 40 47.5	Mr. Walker	Equatorial
	Scorpii, (5382)	Immersion	12 0 33.0	8 41 27.5	Mr. Walker	Equatorial
	Scorpii, (5382)	Immersion		8 41 26.6	Mr. Worden	5 ft. Telescope
26	Ceti, (561)	Immersion	2 35 49.5	8 10 20.9	Mr. Walker	Equatorial

2. ECLIPSE OF SUN, APRIL 24.

	Chron. time.	Mean Time Washington.	Observer.	Instrument.
	h. m. s.	h. m. s.		
mencement of	2 46 37.0	22 33 57.9	Lieutenant Maury	Equatorial
se	3 16 50.0	34 5.2	Lieutenant Page	5 ft. Telescope
		34 5.2	Lieutenant Sands	20 in. Dollond
		33 58.1	Lieutenant Herndon	Prime Vertical
		34 7.8	Mr. Worden	Comet Searcher
		34 13.8	Mr. Kennard	2¼ ft. Dollond
		33 57.8	Mr. MacRae	2 ft. Achromatic

361

MEAN RIGHT ASCENSIONS FOR 1850.0

OF STARS OBSERVED

WITH THE

WEST TRANSIT INSTRUMENT.

NATIONAL OBSERVATORY.

91

α ANDROMEDÆ.

		h.	m.	s.
January	4	0	0	38.72
February	23			38.70
April	29			38.51
September	25			38.46
October	1			38.48
	16			38.66
	23			38.45
	26			38.84
	29			38.47
November	9			38.52
	20			38.51
	23			38.41
	30			38.54
December	3			38.55
	14			38.59
	19			38.73

γ PEGASI.

		h.	m.	s.
February	23	0	5	31.14
September	21			31.02
	25			30.79
	29			31.12
October	1			30.91
	5			30.92
	14			30.96
	16			31.09
	26			31.14
	29			30.86
November	9			31.08
	20			30.96
	23			30.81
	30			31.05
December	3			30.98
	14			30.92
	19			31.00
	23			30.95

ϑ ANDROMEDÆ.

		h.	m.	s.
December	23	0	9	15.87

PISCIUM, (66.)

		h.	m.	s.
September	9	0	12	52.93

BESSEL Z. 136, Dec. —0°52′.

		h.	m.	s.
October	26	0	14	10.39
November	30			10.28
December	14			9.98

BESSEL Z. 136, Dec. —1°10′.

		h.	m.	s.
October	26	0	22	10.25
November	30			9.84
December	14			9.80

ANONYMOUS, Dec. —1°12′.

		h.	m.	s.
December	14	0	22	52.18

BESSEL Z. Dec. —1°18′.

		h.	m.	s.
October	26	0	25	8.96
November	30			8.88
December	14			8.59

BESSEL Z. 136, Dec. —1°21′.

		h.	m.	s.
October	26	0	27	50.88
December	14			50.85

COMET STAR, Dec. —1°21′.

		h.	m.	s.
September	25	0	27	50.80

BESSEL Z. 136, Dec. 1°21′.

		h.	m.	s.
September	25	0	30	24.46
October	26			24.70
November	23			24.38
	30			24.59
December	14			24.46

δ ANDROMEDÆ.

		h.	m.	s.
December	19	0	31	19.11

α CASSIOPEIÆ.

		h.	m.	s.
January	4	0	32	1.61
	13			1.19
	14			1.48
February	4			1.83
	23			1.62
March	9			1.55
	11			1.46
April	2			0.94
September	9			1.34
	16			1.50
	21			1.54
October	5			1.38
	16			1.50
	29			1.34
December	23			1.41

β CETI.

		h.	m.	s.
January	14	0	36	3.48
September	9			3.56
	16			3.59
	21			3.29
October	5			3.62
	29			3.64
	23			3.38

BESSEL Z. 136, Dec. —1°39′.

		h.	m.	s.
October	26	0	38	15.25

BESSEL Z. 136, Dec. —1°41′.

		h.	m.	s.
October	26	0	38	53.91
December	14			53.50

BESSEL Z. 136, Dec. —1°20′.

		h.	m.	s.
December	14	0	40	39.65

δ PISCIUM.

		h.	m.	s.
January	4	0	40	54.18

BESSEL Z. 136, Dec. —1°22′.

		h.	m.	s.
December	14	0	43	36.26

η ANDROMEDÆ.

		h.	m.	s.
October	22	0	49	12.48

ε PISCIUM.

		h.	m.	s.
October	5	0	55	9.70

PISCIUM, (328.)

		h.	m.	s.
October	22	1	0	39.04

BESSEL Z. 136, Dec. —2°48′.

		h.	m.	s.
November	30	1	3	36.01

POLARIS.

			h.	m.	s.
January	4		1	4	61.01
	10				59.03
	13				60.26
	14				57.96
	24				57.13
	28				57.03
February	23				63.58
March	4				62.35
	9				57.64
	11				58.25
	18				59.93
	26				57.91
	30	S. P.			62.09
April	1				63.48
	2	S. P.			60.88
	3	S. P.			60.39
	4	S. P.			60.49
	6				62.86
	6	S. P.			61.53
	9	S. P.			63.27
	9				62.30
	13	S. P.			59.59
	13				61.75
	15	S. P.			(55.49)
	16	S. P.			62.63
	16				(54.63)
	18	S. P.			(52.97)
	18				60.88
	20				65.28
	21	S. P.			61.30
	22	S. P.			58.62
	23	S. P.			62.34
	25	S. P.			57.16
	27				59.61
	29				60.60
May	2	S. P.			59.36
	3				60.20
	4	S. P.			60.93
	11	S. P.			63.45
	11				60.37
	12	S. P.			59.96
	13	S. P.			58.13
	18	S. P.			61.91
	19	S. P.			59.23
	19				58.73
	20	S. P.			61.73
	21	S. P.			62.44
	22	S. P.			62.93
	22				57.85
	25	S. P.			58.84
	27	S. P.			63.45
June	3	S. P.			60.55
	6	S. P.			61.66
	15	S. P.			63.17
	16	S. P.			61.61
	17	S. P.			61.96
	18	S. P.			58.98
July	1	S. P.			60.31
	7	S. P.			61.97
	9	S. P.			60.48
	13	S. P.			66.83
	14	S. P.			58.41
	15	S. P.			63.07
	24	S. P.			60.90
	24				64.09
	30				60.98
August	10	S. P.			(72.43)
September	3	S. P.			62.22
	4	S. P.			61.66
	5	S. P.			60.77
	12	S. P.			61.55
	16				60.52
	21				61.80
	23				62.39
	24	S. P.			59.12
	25				61.38
	29				60.72
	30	S. P.			62.90
October	1				63.13
	5				65.57
	7				61.75
	7				57.94
	8				61.43

POLARIS.

			h.	m.
October	9	S. P.	1	4 6
	16			6
	16	S. P.		6
	23			6
	23	S. P.		6
	25	S. P.		(6
	29			5
November	16			6
	19			5
	23			6

BESSEL Z. 136, Dec. —2°48

November	30	1	14

BESSEL Z. 136, Dec. —2°4

December	30	1	14

ϑ CETI.

January	4	1	16
	8		
	13		
	14		
	22		
	28		
September	25		
	29		
October	5		
	8		
	21		
	22		
	23		

ν PISCIUM.

October	5	1	33

ε CASSIOPEIÆ.

January	4	1	43
	8		
	14		
	22		

α ARIETIS.

January	24	1	58
	28		
May	25		
	26		
September	23		
October	5		
December	9		
	19		

ANDROMEDÆ, (661.)

January	3	2	1
	4		

ARIETIS, (741.)

January	5	2	16

CASSIOPEIÆ, (744.)

January	4	2	16
	8		
	12		
	14		
	22		
	24		

γ Ceti.

		h.	m.	s.
uary	4	2	35	31.94
	5			31.91
	8			31.93
	10			31.90
	12			32.05
	14			31.99
	19			31.96
	22			31.74
	23			31.98
	24			32.05
	26			32.05
	28			31.91
ruary	4			32.10
	9			31.98

α Ceti.

uary	5	2	54	26.50
	8			26.63
	10			26.49
	13			26.41
	14			26.47
	19			26.61
	23			26.57
	26			26.65
	28			26.56
ruary	4			26.66
ember	9			26.53
	14			26.53
	23			(31.44)

ρ Persei.

ember	23	2	55	34.57

β Persei.

iary	12	2	58	25.63
	22			25.60

α Persei.

iary	8	3	13	38.44
	10			38.26
	12			38.24
	13			38.25
	22			38.28
	23			38.14
	24			38.12
	26			38.27
	28			38.14
ruary	4			38.50
	5			38.46
r	9			38.19
	24			38.37
e	2			38.54
	18			38.52

Tauri, (1161.)

iary	12	3	37	25.77

η Tauri.

iary	8	3	38	34.62
	10			34.54
	13			34.31
	14			34.63
	19			34.58
	22			34.38
	24			34.53
	26			34.53
uary	4			34.55
	6			34.63
ember	16			34.49
	23			34.55
mber	9			34.48
	14			34.52

Tauri, (1176.)

		h.	m.	s.
January	10	3	40	15.07
	13			14.89
	19			14.96
	26			15.29
February	5			15.14

Tauri, (1177.)

February	5	3	40	16.40

γ^1 Eridani.

January	10	3	51	1.94
	12			1.88
	13			2.06
	14			1.98
	19			2.11
	22			2.06
	23			1.91
November	23			2.05

A^1 Tauri.

January	8	3	55	50.46

α Tauri.

January	5	4	27	19.06
	10			19.02
	14			18.85
	19			18.90
	23			18.88
	24			19.07
February	4			19.02
March	3			19.07
June	5			19.25
	24			19.11
December	23			19.02

υ^7 Eridani.

January	22	4	29	43.04

Eridani, (1433.)

January	12	4	29	43.36

ι Aurigæ.

May	12	4	47	13.89

ι Tauri.

January	8	4	54	7.99

Orionis, (1591.)

January	8	5	1	6.70

ε Ursæ Minoris, S. P.

July	10	5	1	31.22

α Aurigæ.

January	5	5	5	36.79
	12			36.79
	22			36.92
	28			36.84
February	4			37.01
	18			37.16

α Aurigæ—Continued.

		h.	m.	s.
February	23	5	5	36.90
March	4			36.76
May	12			36.80
	25			37.04
June	6			37.01
July	5			37.04
	9			36.77

β Orionis.

January	8	5	7	19.76
	10			19.93
February	18			19.98
	21			19.66

β Tauri.

January	5	5	16	48.76
	8			48.78
	14			48.71
	19			48.74
	23			48.90
February	4			48.71
	13			48.82
	18			48.79
	21			48.88
	23			48.99
March	3			48.69
	4			48.62
July	9			48.93
	10			48.57

γ Orionis.

January	22	5	17	5.15
	24			5.38

Tauri, (1695.)

February	5	5	18	37.80

δ Orionis.

January	12	5	24	20.62
	23			20.67
	24			20.77
	28			20.78
February	5			20.64
	13			20.76
	18			20.64
	21			20.75
	23			20.84
	26			20.73

α Leporis.

January	5	5	26	6.96
	10			7.01
	13			6.80
	14			6.89
	19			6.94
February	4			6.75
March	3			6.96

ζ Tauri.

February	5	5	28	40.99
April	1			40.94

ε Orionis.

January	5	5	28	36.19
	10			36.15
	13			36.15
	19			36.26
	23			36.31
	24			36.35

ε Orionis—Continued.

		h.	m.	s.
February	13	5	28	36.24
	18			36.27
	21			36.25
	23			(36.43)
	26			36.26
March	4			36.28

ζ Orionis.

January	12	5	33	11.42
	14			11.40
February	21			11.43

α Columbæ.

January	10	5	34	13.02
	13			13.15
	19			13.17
	23			13.16
	30			13.08
February	4			13.05
	13			13.14
	16			13.13
March	3			13.28

κ Orionis.

March	17	5	40	38.76
	21			38.60
	26			38.59

α Orionis.

January	5	5	47	3.09
	10			3.14
	13			3.07
	14			2.96
	23			3.17
February	4			3.18
	5			2.98
	13			3.12
	16			3.18
	18			3.27
	21			3.07
	23			3.22
	26			3.08
March	4			3.12
	21			3.09
	26			2.97
April	1			3.15

δ Aurigæ.

January	12	5	47	10.33

β Aurigæ.

March	3	5	48	31.40

ν Orionis.

March	25	5	59	0.49
April	1			0.50

Anonymous.

February	23	6	5	49.29

μ Geminorum.

January	5	6	13	53.09
	10			53.04
	19			53.16
	23			53.13
	28			53.06
February	4			53.15
March	25			53.15

51 Hev. (Cephei.)

		h. m.	s.
January	14	6 28	34.21
February	4		33.17
	21		35.23

γ Geminorum.

April	1	6 29	2.79
	3		2.82

ε Geminorum.

April	3	6 34	42.16

α Canis Majoris.

January	5	6 38	32.38
	10		32.43
	13		32.33
	19		32.28
	23		32.33
	24		32.33
	28		32.54
February	4		32.38
	13		32.34
	16		32.40
	21		32.34
March	3		32.45
	4		32.43
	9		32.33
	11		32.38
	14		32.35
	17		32.41
	21		32.52
	27		32.41
	31		32.32
April	1		32.39
	3		32.27

ε Canis Majoris.

January	13	6 52	44.05
	20		43.91
	23		43.88
February	16		43.94
March	9		44.04
	10		43.80
	31		43.85
April	3		43.82

ζ Geminorum.

April	3	6 55	12.66

Bessel's Zone, (511.)

March	10	6 57	35.78

δ Canis Majoris.

April	3	7 2	17.55

δ Geminorum.

January	12	7 11	9.50
	13		9.70
	23		9.59
February	18		9.78
	23		9.81
	26		9.52
March	14		9.68
	17		9.50
	27		9.65
	31		9.59
April	1		9.60

Comet Star, Dec. +41.40.

		h. m.	s.
March	10	7 21	19.03

α¹ Geminorum.

January	13	7 25	0.80
	23		0.81
	28		0.79
April	3		0.92

α² Geminorum.

January	13	7 25	1.23
	14		1.19
	23		1.12
	28		1.36
February	13		1.28
	16		1.33
	18		1.30
	21		1.19
	26		1.36
March	3		1.22
	7		1.23
	9		1.17
	10		1.19
	14		1.25
	17		1.27
	21		1.22
	27		1.42
	31		1.28
April	1		1.35
	3		1.27
June	15		1.13

Geminorum, (2486.)

January	12	7 25	2.52
April	4		2.61

Geminorum, (2519.)

January	12	7 30	48.59

α Canis Minoris.

January	13	7 31	26.80
	14		26.63
	23		26.83
	28		26.82
February	4		26.80
	16		26.87
	21		26.73
	26		26.83
March	9		26.78
	10		26.65
	14		26.82
	21		26.75
	27		26.90
	31		26.89
April	4		26.72
July	30		26.74
August	10		26.78
	17		26.88

Camelopardi, (2527.)

March	11	7 31	34.71

κ Geminorum.

April	4	7 35	23.13

β Geminorum.

January	14	7 36	7.68

β Geminorum.—Continued.

		h. m.	s.
January	23	7 36	7.80
	28		7.75
February	16		7.87
	21		(7.55)
March	7		7.75
	9		(7.53)
	10		7.78
	14		7.71
	17		7.70
	21		7.70
	27		7.72
	31		7.71
April	4		7.76
July	30		7.67
August	17		7.71

15 Argus.

January	13	8 1	9.43
	14		9.33
	28		9.43
March	10		9.53
	14		9.44
	26		9.46
April	6		9.33

Cancri, (2836.)

April	4	8 20	14.80
	6		14.84

ϑ Cancri.

January	13	8 23	2.20
	9		2.16

π Ursæ Majoris.

January	14	8 27	2.63

δ Cancri.

January	13	8 36	9.17
March	9		9.15
April	9		9.19

ε Hydræ.

January	13	8 38	49.76
	14		49.61
February	23		49.83
March	10		49.71
	14		49.61
	21		49.75
	26		40.79
	27		49.99
April	1		49.88

Cancri, (3015.)

April	1	8 44	44.46

ι Ursæ Majoris.

January	14	8 48	54.68
	28		54.73
February	16		54.93
	25		54.86
March	26		54.65
April	6		54.78
September	3		54.60
	4		54.54

Comet Star, +53°15′.

April	1	8 50	13 47

α Cancri.

		h. m.
March	7	8 50
April	9	
	14	

σ² Ursæ Majoris.

March	3	8 57

μ Hydræ.

April	1	8 58

κ Cancri.

January	13	8 59
	14	
April	6	
	9	

Cancri, (3138.)

April	1	9 5

Hydræ, (3188.)

April	1	9 13

Draconis, (3199.)

March	26	9 15

α Hydræ.

January	13	9 20
February	25	
March	10	
	18	
	26	
April	6	
	13	
	14	
	15	
	17	
	20	
	27	
September	6	

ϑ Ursæ Majoris.

March	18	9 2
	27	
	30	
April	27	

ξ Leonis.

January	13	9 2
	14	
March	9	
	10	

ο Leonis.

March	10	9 3
	18	
	26	
April	6	

ε Leonis.

February	25	9 3
March	10	
	18	
	26	

ε LEONIS—Continued.

		h.	m.	s.
ch	27	9	37	19.53
	30			19.68
l	1			19.72
	14			19.70
	15			19.74
	17			19.66
	20			19.61
	27			19.63

SERPENTIS, (3295.)

l	1	9	30	37.73

μ LEONIS.

uary	25	9	44	13.46
l	16			13.38

ν LEONIS.

l	1	9	50	8.99

π LEONIS.

ary	14	9	52	16.73
:h	30			16.50

ANONYMOUS.

:h	10	9	52	21.54

α LEONIS.

ary	14	10	0	22.55
:h	10			22.78
	26			22.68
	27			22.59
	30			22.57
	1			22.87
	4			22.65
mber	11			22.69
	13			22.72
	16			22.49
	17			22.71
	18			22.63
	21			22.64
	22			22.71

λ URSÆ MAJORIS.

:h	27	10	8	1.75
	30			1.67
	4			1.88

μ HYDRÆ.

h	30	10	18	50.26

ρ LEONIS.

h	10	10	24	54.56
	30			54.48
	21			54.45

φ HYDRÆ.

h	30	10	31	16.36

CANIS MINORIS, (3685.)

ı	30	10	37	30.69

LEONIS, (3742.)

ı	30	10	47	28.72

LEONIS, (3768.)

		h.	m.	s.
April	21	10	52	48.69

α URSÆ MAJORIS.

February	25	10	54	25.69
March	30			25.59
April	1			25.66
	4			25.50
	22			25.42
	23			25.58
	27			25.42
September	21			25.57
	29			25.21

LEONIS, (3832.)

April	23	11	6	4.99

δ LEONIS.

February	25	11	6	7.54
March	30			7.43
April	2			7.42
	4			7.57
	21			7.40
	25			7.44
	27			7.42
May	4			7.43

δ HYDRÆ ET CRATERIS.

March	30	11	11	50.64
April	2			50.67
	21			50.59
	22			50.70
	25			50.58
	27			50.59
May	4			50.61

COMET-STAR + 66°08′.

May	4 S. P.	11	15	49.40

COMET-STAR + 66°08′.

May	4 S. P.	11	19	(17.76)
	12 S. P.			20.05

•DRACONIS, (3906.)

April	25	11	21	3.70

λ DRACONIS.

April	2	11	22	26.18
	21			26.14
	23			26.35

υ LEONIS.

April	9	11	29	16.24

COMET-STAR + 62°56′.

May	12 S. P.	11	32	51.95

γ CEPHEI.

March	30	11	33	14.15
April	2			13.59
	4			13.99
	27			14.15
July	24			13.85

COMET-STAR + 63°01′.

May	4 S. P.	11	40	51.84
	12 S. P.			51.81

β LEONIS.

		h.	m.	s.
March	30	11	41	24.20
April	2			24.07
	4			24.27
	21			24.25
	22			24.26
	25			24.22
May	11			24.18
	19			24.24

β VIRGINIS.

April	9	11	42	53.01
	23			52.96
May	13			52.89

COMET-STAR + 62°56′.

May	12 S. P.	11	43	6.76

COMET-STAR + 63°11′.

May	12 S. P.	11	43	40.88

γ URSÆ MAJORIS.

March	30	11	45	54.81
April	21			54.88
May	19			55.07
September	5			54.94
	12			54.91
	29			54.89
October	6			54.95

β CASSIOPEIÆ.

April	2	12	1	11.60
May	11			11.72

δ URSÆ MAJORIS.

April	10	12	7	58.60
	23			58.76
May	11			58.50
	13			58.85
	19			58.87

η VIRGINIS.

April	9	12	12	14.05
	23			13.96
May	13			13.97
June	3			13.72

δ CORVI.

March	30	12	22	6.51

β CORVI.

March	30	12	26	31.05
April	1			30.91
	4			30.95
	6			30.81
	9			30.81
	16			30.84
	18			30.87
	21			30.90
	22			30.96
	25			30.89
May	4			30.88
	11			30.83
	13			30.96
	19			30.78
	20			30.97
	21			30.99
	25			30.90

γ VIRGINIS.

April	9	12	34	3.75
	21			3.64

γ VIRGINIS—Continued.

		h.	m.	s.
April	23	12	34	3.74
May	11			3.55
	13			3.62
	19			3.61
	21			3.77
	25			3.72
June	3			3.59

12 CANUM VENATICORUM.

March	30	12	48	60.13
April	6			59.98
	22			60.03
May	20			60.11
June	3			59.95
	15			60.23
	17			60.05
July	7			60.10
	9			60.22
	13			60.25
	14			60.16

COMÆ, (4390.)

March	30	12	59	58.57

VIRGINIS, (4449.)

March	30	13	10	34.18

α VIRGINIS.

March	30	13	17	17.90
April	6			17.75
	9			17.92
	13			17.78
	16			17.73
	18			17.69
	21			17.65
	23			17.77
	25			17.78
May	2			17.72
	4			17.72
	11			17.78
	12			17.83
	13			17.69
	18			17.86
	19			17.56
	20			17.80
	21			17.79
	25			17.70
	27			17.81
June	6			17.89
	15			17.85
	16			17.79
	17			17.69
	18			17.79
July	1			17.74
	7			17.71
	9			17.80
	13			17.88
	14			17.78
	15			17.54
	24			17.79
September	22			(18.04)
	24			17.65
	30			17.62
October	23			17.90

VIRGINIS, (4565.)

March	30	13	33	44.66
May	13			44.57
June	16			44.71

α AQUILÆ.

		h.	m.	s.
January	27	19	43	27.87
February	4			28.00
June	24			27.75
July	8			27.78
	9			27.78
	24			27.74
	30			27.92
August	3			27.62
	5			27.76
	6			27.73
	10			27.71
	29			27.71
	31			27.90
September	1			27.81
	7			27.75
	24			27.77
	25			27.87
October	1			27.75
	3			27.70
	5			27.77
	7			27.83

SAGITTARII, (6803.)

September	2	19	43	28.55
	30			28.74

β AQUILÆ.

May	27	19	47	56.55
June	24			56.59
July	9			56.72
August	3			56.55
	6			56.58
	10			56.52
	20			56.65
	31			56.70
September	1			56.66
	7			56.66
	23			56.64
	25			56.78
	30			56.69
October	5			56.64
	7			56.64

ϑ AQUILÆ.

August	3	20	3	33.70
	20			33.77
September	2			33.73
	7			33.74
	9			33.83
October	3			33.73

α² CAPRICORNI.

July	9	20	9	43.57
	24			43.74
August	5			43.72
	10			43.72
	20			43.64
September	1			43.69
	2			43.51
	7			43.69
	9			43.57
	23			43.47
	30			43.76
October	1			43.65
	2			43.54
	7			43.64
	9			43.57
	14			43.64

β CAPRICORNI.

August	3	20	12	34.50
	11			34.61
September	2			34.60
	9			34.70
	30			34.87

λ URSÆ MINORIS.

		h.	m.	s.
July	7	20	13	4.54
	9		13	5.73
	14		13	4.71
	15		13	3.50
	24		12	58.99
	30		13	6.57
August	3		12	58.86
	4		13	0.19
	6		13	0.23
	10		13	1.34
September	1		13	4.41
	7		12	58.86
	14		13	0.28
	21		13	0.30
	23		13	5.98
	29		(12	52.09)
	30		(12	53.38)
October	1		12	56.91
	3		12	59.71
	5		13	2.22
	6		(12	52.65)
	7		13	1.42
	8		12	59.04
	14		12	59.69
	15		(12	38.75)
	16		(12	52.11)
	19		12	59.70
	21		12	46.05
	24		12	45.39
	26		12	58.31

α CYGNI.

January	27	20	36	19.11
February	22			19.23
July	7			19.05
	9			19.15
	24			18.97
August	6			18.99
	20			19.07
September	2			19.09
	20			19.07
	23			19.13
October	3			19.06
	5			19.09
	10			18.98
	14			10.05
	19			18.97

ε AQUARII.

July	9	20	39	32.95
	10			33.06
August	5			33.12
	6			32.99
September	2			33.09
	30			33.20
October	10			32.92

μ AQUARII.

July	9	20	44	33.55
	10			33.52
August	5			33.56
September	2			33.50
October	10			33.35

61¹ CYGNI.

July	7	21	00	10.80
	10			10.68
	30			10.83
August	3			10.58
	4			10.64
	5			10.76
September	1			10.77
	2			10.66
	7			10.48
	25			10.60

61¹ CYGNI.—Continued.

		h.	m.	s.
October	1	21	00	10.55
	5			10.73
	6			10.57
	7			10.61
	8			10.63
	9			10.64
	10			10.49
	14			10.57
	15			10.59
	19			10.57
	20			10.59
	24			10.60
	25			10.74
	26			10.66
November	3			10.77

61² CYGNI.

August	4	21	00	12.05

ν AQUARII.

October	1	21	1	25.00
October	17			24.94

ζ CYGNI.

February	22	21	6	33.10
July	24			33.22
	30			33.24
August	6			33.05
September	1			33.31
	2			33.12
	7			33.03
October	5			33.15
	6			33.21
	7			33.18
	8			33.17
	9			33.24
	14			33.15
	15			33.22
	17			33.09
	19			33.16
	20			33.19
	21			33.13
	24			33.19
	25			33.25
	26			33.30
November	3			33.23

σ CYGNI.

September	1	21	11	31.63
	2			31.51
October	6			31.47
	8			31.57
	15			31.48
	17			31.47
	20			31.53

α CEPHEI.

January	14 S. P.	21	15	00.49
	28	21	14	59.17
February	19			59.96
	22			59.65
March	3			59.30
April	17			59.76
	20			59.61
September	2			59.42
October	6			59.35
	8			59.65
	15			59.57
	20			59.47
	24			59.58
	25			59.59

α CEPHEI—Continued.

		h.	m.	s.
October	26	21	14	59.69
	29			59.55
November	3	21	15	00.04

β AQUARII.

July	10	21	23	39.54
August	6			39.42
September	30			39.58
October	5			39.49
	6			39.48
	7			39.56
	8			39.40
	9			39.41
	14			39.47
	16			39.57
	17			39.51
	21			39.59
	24			39.58
	25			39.53
	26			39.56
	28			39.70
	29			39.69
November	3			39.37

β CEPHEI.

January	28	21	26	41.78
February	19			42.17
October	6			42.13
	8			42.11
	10			41.80
	17			41.96
	26			42.07

ε PEGASI.

July	10	21	36	49.08
August	8			49.11
	12			49.03
September	30			49.01
October	5			49.15
	8			48.97
	9			49.00
	17			48.99
	19			49.11
	21			49.14
	26			49.22
	29			49.13
November	16			49.13

δ CAPRICORNI.

September	2	21	38	45.36
October	6			45.38
	15			45.31

γ GRUIS.

October	26	21	44	50.03

AQUARII, (7648.)

October	24	21	50	18.95
	25			19.19
	26			19.03
	28			18.86
	29			18.92
November	10			18.94
	16			18.90
	23			18.96
December	3			18.94
	4			19.02

ESSEL 189, Dec. —13°35′.

		h.	m.	s.
nber	10	21	52	19.16

ESSEL 198, Dec. —13°36′.

		h.	m.	s.
er	29	21	52	19.58

COMET-STAR — 13°34′.

		h.	m.	s.
er	26	21	53	00.00

α AQUARII.

		h.	m.	s.
	29	21	58	4.53
st	8			4.76
	12			4.66
mber	28			4.76
er	9			4.58
	14			4.67
	15			4.46
	19			4.73
	29			4.64

ι AQUARII.

		h.	m.	s.
	10	21	58	19.84
er	28			19.22

α GRUIS.

		h.	m.	s.
mber	30	21	58	45.08
er	5			45.39
	7			45.21
	8			45.05
	17			44.98

ϑ AQUARII.

		h.	m.	s.
	10	22	8	54.88
mber	30			54.95
er	28			54.85

LACERTÆ, (7777.)

		h.	m.	s.
er	10	22	9	26.00
	15			25.83
	17			26.05
nber	10			26.32

γ AQUARII.

		h.	m.	s.
nber	30	22	13	54.48
er	8			54.40
	15			54.38
	17			54.29
nber	10			54.54

η AQUARII.

		h.	m.	s.
iber	15	22	27	38.81
	28			38.89
r	8			38.78
	15			38.85
	28			38.80

LACERTÆ, (7880.)

		h.	m.	s.
September	30	22	29	12.82
October	17			12.99
November	10			13.12

α PISCIS AUST.

		h.	m.	s.
August	12	22	29	21.14
September	15			21.05
	30			21.12
October	9			21.01
	10			20.88
	15			21.10

ζ PEGASI.

		h.	m.	s.
August	12	22	33	58.89
September	15			58.81
	28			58.94
October	9			58.77
	14			59.05
	15			58.73
	17			58.85
	19			58.91
	21			58.95
	24			58.80
	26			59.09
	28			58.80
	29			59.01
November	9			58.90
	10			58.92
December	3			58.90

λ AQUARII.

		h.	m.	s.
September	28	22	44	47.08
	30			47.20
October	15			47.12
	24			47.18

α PISCIS AUSTRALIS.

		h.	m.	s.
October	23	22	49	21.20
	24			20.97
	26			21.22
	28			21.10
November	16			21.20
	20			21.31
	23			20.90

ο ANDROMEDÆ.

		h.	m.	s.
October	10	22	55	1.69

α PEGASI.

		h.	m.	s.
July	28	22	57	17.40
August	12			17.49
September	15			17.36
	28			17.50
October	9			17.44
	15			17.49

α PEGASI—Continued.

		h.	m.	s.
October	19	22	57	17.39
	21			17.48
	23			17.63
	24			17.46
	26			17.61
	28			17.40
	29			17.52
November	9			17.41
	10			17.51
	20			17.42
December	3			17.60

PEGASI, (8052.)

		h.	m.	s.
October	10	22	59	48.55

φ AQUARII.

		h.	m.	s.
September	28	23	6	33.16
October	28			33.11

γ PISCIUM.

		h.	m.	s.
October	15	23	9	33.16
	24			23.50

ψ³ AQUARII.

		h.	m.	s.
September	28	23	11	09.43
October	22			9.36
	28			9.43

AQURII, (8144.)

		h.	m.	s.
October	24	23	13	5.27
	28			5.21

ι PISCIUM.

		h.	m.	s.
October	9	23	32	14.11
	14			14.21
	15			14.25
	16			14.37
	21			14.33
	22			14.20
November	10			14.31
	20			14.39
December	3			14.27
	14			14.12

γ CEPHEI.

		h.	m.	s.
January	28	23	33	13.39
February	20			14.17
	23			13.85
October	23			13.96
	29			13.79

γ CEPHEI—Continued.

		h.	m.	s.
November	9	23	33	(14.95)
	16			13.80
	23			(12.79)
	30			(12.50)
December	3			14.01

λ PISCIUM.

		h.	m.	s.
October	22	23	34	23.54

PEGASI, (8250.)

		h.	m.	s.
October	24	23	35	44.44

PISCIUM, (8262.)

		h.	m.	s.
October	10	23	38	43.76
	22			43.69

PISCIUM, (8271.)

		h.	m.	s.
October	24	23	40	13.88

PEGASI, (8284.)

		h.	m.	s.
October	29	23	42	4.32

PEGASI, (8296.)

		h.	m.	s.
October	23	23	44	47.12

PEGASI, (8350.)

		h.	m.	s.
October	23	23	54	20.73

COMET-STAR —0°27′.

		h.	m.	s.
November	23	23	54	29.95
	30			30.31

COMET-STAR —0°26′.

		h.	m.	s.
October	29	23	54	25.05
November	20			25.17
	23			24.99
	30			25.09
December	19			25.08

COMET-STAR —0°32′.

		h.	m.	s.
October	26	23	59	27.61
November	30			27.57
December	3			27.45

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DECLINATIONS

OBSERVED WITH

THE MURAL CIRCLE,

REDUCED TO 1850.0.

NATIONAL OBSERVATORY.

α ANDROMEDÆ—Æ. 0*h*. 0*m*. 38*s*.

		° ′ ″
Jan.	5	+ 28 15 44.02
	18	42.85
Feb.	18	44.66
Mar.	5	44.40
July	24	43.05
	29	(42.37)
Sept.	14	44.33
	23	43.07
	25	43.46
Oct.	7	43.35
Nov.	9	43.40
	30	44.68
Dec.	12	43.96

Cor. applied for errors of div. —0″.18

γ PEGASI—Æ. 0*h*. 5*m*. 31*s*.

Jan.	18	+ 14 20 58.76
July	24	56.77
	29	56.39
Sept.	14	57.37
	23	56.50
Oct.	5	57.27
	7	56.86
Nov.	9	(60.27)

WEISSE O. 246—Æ. 0*h*. 14*m*. 10*s*.

Sept.	29	— 0 50 12.76
Oct.	5	13.32
	23	12.83
Nov.	30	11.81
Dec.	14	(9.90)

WEISSE O. 368—Æ. 0*h*. 22*m*. 9*s*.

Sept.	25	— 1 9 5.58
	29	5.23
Oct.	5	5.26
	23	5.97

WEISSE O. 425—Æ. 0*h*. 25*m*. 8*s*.

Nov.	30	— 1 16 23.05
Dec.	14	(21.63)

***WEISSE O. 479—Æ. 0*h*. 27*m*. 50*s*.**

Sept.	25	— 1 19 49.59
	29	49.30
Nov.	30	(45.67)
Dec.	14	(45.57)

***CETI 163—Æ. 0*h*. 30*m*. 24*s*.**

Sept.	25	— 1 19 45.51
	29	44.64
Nov.	30	(40.95)
Dec.	14	(41.07)

α CASSIOPEIÆ—Æ. 0*h*. 32*m*. 1*s*.

		° ′ ″
Jan.	13	+ 55 42 (52.16)
	18	49.45
Feb.	3	51.16
	4	50.54
	10	50.71
	18	50.94
	23	50.75
Mar.	5	51.55
Apr.	14	49.02
July	24	+ 55 42 49.51
Oct.	5	50.06
	6	51.00
Nov.	9	51.65
Dec.	12 (ref.)	52.16
	12	49.47

α CASSIOPEIÆ (S. P.)

Feb.	4	+ 55 42 44.97
	23	46.36
Mar.	5	41.95
April	9	46.26
May	13	43.95
	19	45.59

***WEISSE O. 712—Æ. 0*h*. 40*m*. 40*s*.**

Sept.	25	— 1 18 28.29
	29	27.12
Nov.	30	(24.30)
Dec.	14	(23.86)

***WEISSE O. 762—Æ. 0*h*. 43*m*. 36*s*.**

Nov.	30	— 1 21 (7.75)
Dec.	14	(8.25)

***WEISSE O. 772—Æ. 0*h*. 43*m*. 57*s*.**

Sept.	29	— 1 18 13.41
Nov.	30	(9.12)
Dec.	14	(10.69)

WEISSE I. 40—Æ. 1*h*. 3*m*. 36*s*.

Sept.	29	— 2 47 6.33
Dec.	14	4.46

POLARIS—Æ. 1*h*. 5*m*. 1*s*.

		hh.	° ′ ″
Jan.	3	1.3	+ 88 30 33.66
	5	1.4	34.92
	8	1.2	35.29
	10	1.2	35.72
	13	1.4	34.61
	14	1.3	35.38
	18	1.4	33.85
	19	1.35	35.19
	22	1.15	35.26
	23	1.2	36.49
	24	1.35	35.52
	26	1.35	34.92
	28	1.35	36.25
Feb.	3	1.4	35.70
	4	1.35	35.08
	10	1.35	35.72
	12	1.2	35.71
	17	1.2	35.70
	18	1.2	34.24
	23	1.35	36.13
Mar.	4	1.35	34.08
	5	1.2	36.02
	9	1.15	35.45
	11	1.2	35.85
	12	1.35	35.37
April	1	1.2	35.09
	3	1.3	36.59
	8	1.2	34.74
	13	1.2	34.54
	14	1.2	34.57

POLARIS—Æ. 1*h*. 5*m*. 0*s*.

		hh.	° ′ ″
April	15	1.4	+ 88 30 34.85
	17	1.4	35.44
	19	1.2	34.84
	26	1.2	35.00
	29	1.35	34.47
	30	1.35	33.88
May	5	1.35	34.86
	11	1.15	33.31
	18	1.2	34.22
	19	1.35	34.38
June	21	1.35	33.97
July	24	1.35	34.16
Sept.	13	1.2	34.92
	14	1.35	34.13
	15	1.2	36.23
	16	1.35	33.18
	23	1.35	33.42
	24	1.2	35.61
	25	1.3	35.35
	30	1.2	34.99
Oct.	5	1.35	34.34
	6	1.2	35.09
	8	1.15	35.40
	10	1.15	34.27
	23	1.35	35.37
	28	1.35	34.61
Nov.	16	1.2	34.62
	30	1.35	33.84
Dec.	4	1.35	35.37
	12	1.15	33.91
	19	1.15	34.60
	26	1.15	34.44

Cor. applied for errors of div. +0″.04.

POLARIS, S. P.

		hh.	
Feb.	4	1.4	+ 88 30 34.82
	23	1.35	35.01
Mar.	5	1.2	35.72
	10	1.3	34.89
	30	1.35	35.33
	31	1.4	34.62
April	3	1.35	34.45
	4	1.15	34.55
	6	1.35	34.78
	9	1.2	35.90
	13	1.35	35.18
	15	1.15	36.84
	16	1.3	34.34
	17	1.15	35.23
	18	1.35	34.91
	20	1.15	34.84
	21	1.3	34.17
	22	1.15	33.95
	23	1.35	35.54
	27	1.15	36.09
May	2	1.35	35.07
	4	1.15	34.95
	11	1.35	36.37
	12	1.15	35.54
	13	1.2	35.29
	19	1.15	35.49
	20	1.35	34.33
	21	1.2	35.47
	22	1.35	35.29
	27	1.35	35.57
June	4	1.35	35.52
	6	1.15	36.53
	15	1.35	34.95
	16	1.35	34.45
	17	1.35	35.52
	24	1.1	34.70
July	1	1.4	34.91
	6	1.4	34.29
	7	1.15	34.79
	8	1.35	34.69

POLARIS, S. P.

		hh.	° ′
July	10	1.4	+ 88 30 3
	13	1.4	3
	14	1.4	3
	24	1.4	3
Aug.	3	1.4	3
	5	1.4	3
	12	1.35	3
Sept.	16	1.15	3
	19	1.15	3
	24	1.15	3
	25	1.35	3
	28	1.2	3
Oct.	10	1.15	3
	16	1.15	3
Nov.	15	1.15	3
	19	1.1	3

WEISSE I. 72—Æ. 1*h*. 5*m*.

Dec.	14	— 2 39 1

WEISSE I. 225—Æ. 1*h*. 14*m*.

Sept.	29	— 2 47
Dec.	14	

ϑ′ CETI—Æ. 1*h*. 16*m*. 31*s*. Δα′=

Oct.	7	— 8 57 3

WEISSE I. 564—Æ. 1*h*. 32*m*.

Sept.	29	— 3 16 5
Oct.	7	5

WEISSE I. 594—Æ. 1*h*. 33*m*.

Sept.	29	— 3 22 5
Oct.	5	5
Dec.	19	5

WIESSE I. 715—Æ. 1*h*. 39*m*.

Oct.	7	— 3 51 5
Dec.	19	5

WEISSE I. 727—Æ. 1*h*. 40*m*.

Oct.	7	— 3 59 3

WEISSE I. 813—Æ. 1*h*. 45*m*.

Oct.	7	— 3 51 3

WEISSE I. 942—Æ. 1*h*. 52*m*.

Oct.	7	— 4 5 5
Dec.	19	5

α ARIETIS—Æ. 1*h*. 58*m*. 43

Jan.	26	+ 22 45
	28	
Feb.	3	
	23	
Oct.	7	
Dec.	30	

— 0″.05 has been applied to all direct observations after January 5, above the pole;
+ 0″.05 to those below the pole, and to observations by reflection.
* The observations of these stars on Nov. 30 and Dec. 14 are very doubtful.

eisse II. 120—Æ. 2h. 8m. 23s.

			°	'	"
.	23	. .	— 4	47	35.66

eisse II. 159—Æ. 2h. 10m. 43s.

.	23	. .	— 4	47	39.30

eisse II. 442—Æ. 2h. 26m. 39s.

.	23	. .	— 6	17	53.87

eisse II. 443—Æ. 2h. 26m. 39s.

:.	23	. .	— 6	17	48.51

Veisse II. 475—Æ. 2h. 28m. 5s.

.	23	. .	— 6	19	45.75

eisse II. 566—Æ. 2h. 32m. 39s.

:.	23	. .	— 6	19	37.97*

orrected for a presumed error of 0r.1 in the mic. reading.

γ Ceti—Æ. 2h. 35m. 32s.

i.	5	. .	+ 2	36	4.37
	10	. .			4.60
	13	(ref.)			3.22
	18	. .			4.74
	19	. .			4.57
	24	(ref.)			4.14
	28	. .			2.75
).	3	. .			3.97
	4	. .			4.08
	12	. .			4.50
r.	30	. .			3.22
c.	12	. .			3.99
	30	. .			3.33

rsei(871 B.A.C.)—Æ. 2h. 41m. 6s.

.	18	. .	+ 37	41	52.50

α Ceti—Æ. 2h. 54m. 26s.

.	5	. .	+ 3	29	52.43
	13	(ref.)			52.19
	18	. .			55.55
	22	. .			53.06
	24	(ref.)			54.50
	28	. .			51.62
'.	3	. .			54.08
	4	. .			54.15
	12	. .			54.84

:rsei(953 B.A.C.)-Æ. 2h.55m.35s.

.	19	. .	+ 38	15	20.70

α Persei—Æ. 3h. 13m. 38s.

.	5	. .	+ 49	19	20.64
	10	. .			21.20
	13	(ref.)			23.90
	18	. .			22.15
	19	. .			22.28
	22	. .			21.76
	24	(ref.)			22.75
	28	. .			21.88
.	3	. .			21.52
	4	. .			21.48
	9	. .			22.72
	12	. .			22.00
	18	. .			21.75

r. applied for errors of div. to ob'ns. by ref. —0″.04.

Weisse III. 569—Æ. 3h. 30m. 57s.

			°	'	"
Jan.	28	. .	+ 13	24	9.51

Anonymous—Æ. 3h. 34m. 18s.

Jan.	28	. .	+ 13	19	2.04

Tauri (1164 B.A.C.)-Æ. 3h.38m.26s.

Jan.	10	. .	+ 23	38	53.18
	24	. .			51.98

η Tauri—Æ. 3h. 38m. 34s.

Jan.	5	. .	+ 23	38	13.11
	10	. .			14.04
	13	. .			13.87
	19	. .			13.22
	24	. .			12.47
Feb.	18	. .			14.62

Weisse III 878—Æ. 3h. 45m. 22s.

Feb.	9	. .	+ 14	44	6.80
	12	. .			8.37

Anonymous—Æ. 3h. 50m. 9s.

Feb.	9	. .	+ 14	39	11.37

γ^1 Eridani—Æ. 3h. 51m. 2s.

Jan.	5	. .	— 13	56	17.11
	10	. .			17.67
	13	. .			18.12
	18	. .			16.80
	19	. .			17.36
	24	. .			19.50
	28	. .			17.99
Feb.	18	. .			17.27

1089 Rumker—Æ. 3h. 59m. 13s.

Feb.	9	. .	+ 14	45	26.30
	12	. .			27.97

Weisse IV. 24—Æ. 4h. 2m. 13s.

Feb.	12	. .	+ 14	50	20.38

1110 Rumker—Æ. 4h. 3m. 55s.

Jan.	18	. .	+ 16	53	14.88

Tauri (1332 B. A.C.)-Æ. 4h. 12m. 7s.

Feb.	12	. .	+ 14	43	47.32

Weisse IV. 286—Æ. 4h. 14m. 14s.

Feb.	9	. .	+ 14	41	57.82
	12	. .			52.11

Anonymous—Æ. 4h. 19m. 51s.

Feb.	12	. .	+ 14	45	58.43

Tauri (1395 B.A.C.)-Æ. 4h.22m.37s.

Feb.	12	. .	+ 14	46	32.36

Weisse IV. 533—Æ. 4h. 25m. 27s.

Feb.	12	. .	+ 14	50	35.21

α Tauri—Æ. 4h. 27m. 19s.

			°	'	"
Jan.	5	. .	+ 16	12	12.75
	10	. .			12.70
	12	. .			12.53
	13	. .			12.34
	18	. .			13.26
	19	. .			12.25
	22	. .			11.02
	24	. .			12.04
	28	(ref.)			11.91
Feb.	18	. .			13.84
Mar.	3	. .			(13.93)

Anonymous—Æ. 5h. 0m. 5s.

Feb.	18	. .	+ 29	35	28.45

Bessel Z. 513—Æ. 5h. 0m. 10s.

Feb.	18	. .	+ 29	36	0.46

Bessel Z. 398—Æ. 5h. 2m. 6s.

Feb.	18	. .	+ 29	42	48.14

α Aurigæ—Æ. 5h. 5m. 37s.

Jan.	5	. .	+ 45	50	22.04
	12	. .			20.48
	13	. .			20.59
	19	. .			21.86
	23	. .			21.26
	24	. .			20.78
Feb.	4	. .			21.94
	9	. .			(24.25)
	23	. .			21.83
Mar.	5	. .			22.09

β Orionis—Æ. 5h. 7m. 20s.

Jan.	10	. .	— 8	22	43.57
	28	. .			44.13

β Tauri—Æ. 5h. 16m. 49s.

Jan.	5	. .	+ 28	28	31.29
	10	(ref.)			32.25
	12	. .			(29.67)
	13	. .			30.41
	19	. .			31.49
	23	. .			31.96
	24	. .			31.53
	28	. .			31.32
Feb.	4	. .			32.02
	23	. .			31.64
Mar.	3	. .			31.69
	5	. .			32.46

Cor. applied for errors of div. +0″.04.

δ Orionis—Æ. 5h. 24m. 21s.

Jan.	5	. .	— 0	24	51.48
	12	. .			51.49
	13	. .			51.44
	24	. .			53.85
Feb.	4	. .			52.83
	23	. .			54.08
Mar.	5	. .			52.63

α Leporis—Æ. 5h. 26m. 7s.

Jan.	19	. .	— 17	55	58.31

ε Orionis—Æ. 5h. 28m. 36s.

Jan.	10	. .	— 1	18	6.91
	28	. .			5.91

Bessel Z. 513—Æ. 5h. 32m. 54s.

			°	'	"
Feb.	18	. .	+ 29	46	14.80
	23	. .			15.35
Mar.	3	. .			13.26
	7	. .			13.54

α Columbæ—Æ. 5h. 34m. 13s.

Jan.	5	. .	— 34	9	26.03
	10	. .			24.68
	13	. .			24.96
	19	. .			24.07
	23	. .			26.83
	24	. .			(27.83)
	28	. .			25.83
Feb.	4	. .			25.54
Mar.	5	. .			25.76

Bessel Z. 513—Æ. 5h. 39m. 20s.

Mar.	7	. .	+ 29	41	31.78

Bessel Z. 513—Æ. 5h. 39m. 41s.

Feb.	23	. .	+ 29	40	14.56
Mar.	3	. .			15.51
	7	. .			14.24

κ Orionis,
(1843 B. A. C.)—Æ. 5h. 40m. 39s.

April	27	. .	— 9	43	36.30
	30	. .			37.25
July	19	. .			36.87

α Orionis—Æ. 5h. 47m. 3s.

Jan.	5	. .	+ 7	22	29.31
	10	. .			30.07
	12	. .			30.61
	13	. .			29.74
	14	. .			28.23
	19	. .			(31.49)
	23	. .			28.04
	24	. .			28.05
	28	. .			28.72
Feb.	4	. .			28.94
Mar.	7	. .			28.71
	9	. .			28.47
	11	. .			29.95

κ Aurigæ,
(2001 B. A. C.)—Æ. 6h. 5m. 50s.

Feb.	18	. .	+ 29	32	53.29
	23	. .			53.06
Mar.	3	. .			54.11
	7	. .			52.07
	10	. .			52.84

μ Geminorum—Æ. 6h. 13m. 53s.

Jan.	14	. .	+ 22	35	6.21
Mar.	7	. .			7.33
	9	. .			7.37
	11	. .			7.61

51 (Hev.) Cephei—Æ. 6h. 28m. 34s.

Jan.	14	. .	+ 87	15	22.19

51 (Hev.) Cephei, S.P.

July	6	. .	+ 87	15	21.64
Aug.	5	. .			20.64

55 AURIGÆ,
2182 B. A. C.—Æ. 6h. 32m. 8s.

			°	′	″
Feb.	18	+	44	39	45.29
Mar.	3				45.58

BESSEL Z. 511—Æ. 6h. 33m. 48s.

Feb.	18	+	44	38	57.45
Mar.	3				55.52

56 AURIGÆ,
2200 B. A. C.—Æ. 6h. 35m. 54s.

Mar.	14	+	43	43	15.04

ANONYMOUS—Æ. 6h. 35m. 56s.

Mar.	14	+	43	44	3.58

BESSEL Z. 511—Æ. 6h. 37m. 57s.

Feb.	4	+	43	59	35.60
Mar.	11				34.96

BESSEL Z. 511—Æ. 6h. 38m. 30s.

Feb.	4	+	43	55	15.67
Mar.	10				13.93
	11				13.24
	21				13.59

α CANIS MAJORIS—Æ. 6h. 38m. 32s.

Jan.	14	—	16	30	50.02
	28				50.53
Mar.	5				49.46
	9				48.07

BESSEL Z. 511—Æ. 6h. 41m. 0s.

Feb.	4	+	43	50	18.75
Mar.	11				21.16

ε CANIS MAJORIS—Æ. 6h. 52m. 44s.

Jan.	14	—	28	46	16.73
Mar.	3				15.38
	5				17.94
	9				16.66

BESSEL Z. 516—Æ. 6h. 56m. 16s.

Feb.	4	+	43	5	27.08
Mar.	21				24.58

BESSEL Z. 511—Æ. 6h. 56m. 56s.

Feb.	4	+	42	57	55.53

ANONYMOUS—Æ. 7h. 7m. 34s.

Mar.	21	+	41	48	55.92

ANONYMOUS—Æ. 7h. 11m. 2s.

Mar.	21	+	41	37	51.14

ANONYMOUS—Æ. 7h. 11m. 5s.

			°	′	″
Feb.	4	+	41	57	9.95

δ GEMINORUM—Æ. 7h. 11m. 9s.

Feb.	23	+	22	15	13.46
Mar.	7				13.29
	9				13.07

BESSEL Z. 492—Æ. 7h. 11m. 30s.

Feb.	18	+	41	35	16.60
Mar.	3				(12.06)
	10				15.49
	14				14.95

BESSEL Z. 492—Æ. 7h. 13m. 0s.

Feb.	18	+	41	38	39.06
Mar.	3				38.13
	10				38.23
	14				38.61

14473 LALANDE—Æ. 7h. 19m. 50s.

Feb.	4	+	41	9	2.59

BESSEL Z. 452*—Æ. 7h. 20m. 41s.

Mar.	21	+	40	38	54.53

BESSEL Z. 492—Æ. 7h. 21m. 17s.

Mar.	10	+	41	46	27.68

BESSEL Z. 492—Æ. 7h. 23m. 20s.

Mar.	14	+	41	29	18.71

BESSEL Z. 452*—Æ. 7h. 24m. 56s.

Mar.	21	+	40	48	34.34

BESSEL Z. 492—Æ. 7h. 24m. 58s.

Feb.	18	+	41	47	13.89

α¹ GEMINORUM—Æ. 7h. 25m. 0s.

Jan.	28	+	32	13	41.09
Feb.	23				(42.27)

α² GEMINORUM—Æ. 7h. 25m. 1s.

Jan.	28	+	32	13	44.23
Feb.	23				(45.75)
Mar.	5				44.07
	9				44.98

BESSEL Z. 452 & 492—Æ. 7h. 27m. 0s.

Feb.	4	+	41	10	18.75

BESSEL Z. 452 & 592—Æ. 7h. 27m. 1s.

Feb.	4	+	41	6	44.63

α CANIS MINORIS—Æ. 7h. 31m. 27s.

			°	′	″
Jan.	14	+	5	36	20.61
	28				19.64
Feb.	23				21.03
Mar.	3				20.42
	9				22.04
	31				22.30

β GEMINORUM—Æ. 7h. 36m. 8s.

Jan.	14	+	28	23	0.38
Feb.	23				1.35
Mar.	5				1.98

Cor. applied for errors of div. +0″.04.

ANONYMOUS—Æ. 7h. 41m. 1s.

Mar.	21	+	38	12	9.06

† ANONYMOUS—Æ. 7h. 41m. 42s.

Feb.	4	+	38	10	43.95
Mar.	21				42.49

ANONYMOUS—Æ. 7h. 42m. 28s.

Mar.	10	+	38	19	6.63
	14				7.88
	31				8.90

ANONYMOUS—Æ. 7h. 44m. 51s.

Feb.	4	+	38	13	53.96
Mar.	14				55.11
	21				53.07

15 ARGUS—Æ. 8h. 1m. 9s.

Jan.	14	—	23	52	30.50
Mar.	3				29.01
	5				30.14
	9				28.49
	10				29.74
	11				28.58
	21				30.48
	31				29.83
April	1				30.52

BESSEL Z. 401—Æ. 8h. 24m. 41s.

Mar.	10	+	31	23	19.06
	21				18.95

BESSEL Z. 350—Æ. 8h. 26m. 46s.

Feb.	4	+	30	31	51.10
Mar.	14				51.16
	31				52.06

ANONYMOUS—Æ. 8h. 28m. 56s.

Feb.	4	+	30	32	19.46

ε HYDRÆ—Æ. 8h. 38m. 50s.

Jan.	14	+	6	57	57.29
Feb.	4				58.11
Mar.	31				57.34
April	1				57.20
	3				57.16

ι URSÆ MAJORIS—Æ. 8h. 48m. 55s.

			°	′	″
Jan.	14	+	48	37	37.18
Feb.	23				35.96
Mar.	5				37.84
April	1				36.26
	3				36.68

δ URSÆ MAJORIS (3049 B. A. C.)
Æ. 8h. 48m. 56s.

Mar.	31	+	68	12	30.55

BESSEL Z. 344—Æ. 8h. 49m. 48s.

Feb.	4	+	24	32	34.31
Mar.	10				34.09
	21				32.18

WEISSE VIII. 1529—Æ. 9h. 0m. 6s.

April	16	—	12	42	27.78

α HYDRÆ—Æ. 9h. 20m. 13s.

Feb.	4	—	8	0	38.16
Mar.	5				36.80
	10				39.12
	14				36.84
April	1				36.46
	3				39.45
	4				39.29
	20				38.73

ϑ URSÆ MAJORIS—Æ. 9h. 22m. 48s.

Feb.	23	+	52	21	28.81

ε LEONIS—Æ. 9h. 37m. 20s.

Feb.	4	+	24	27	44.95
Mar.	14				45.43
	31				45.07
April	1				45.34
	3				45.58
	4				45.06

α LEONIS—Æ. 10h. 0m. 23s.

Feb.	4	+	12	41	54.13
	23				54.53
Mar.	14				55.46
	31				54.60
April	1				55.60
	3				54.90
	4				54.18
	22				54.91
Sept.	15				54.00

α URSÆ MAJORIS—Æ. 10h. 54m. 26s.

Feb.	4	+	62	33	34.40
	23				35.37
Mar.	5				35.80
	10				35.23
	14				35.75
April	4				35.33
	22				34.42
	23				35.50
May	12				34.82

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* The declinations of these two stars are probably 1′ too small; compare Bessel and Lalande.

† R. A. may be 1m. more; and the corresponding cor. of the dec. —0″.26.

α URSÆ MAJORIS, S. P.

		° ′ ″
	29	+ 62 33 33.27
	12	32.89
	1	35.97
	7	33.81
	29	33.44
	9	34.03
	30	35.89
	4	33.41

δ LEONIS—Æ. 11h. 6m. 7s.

	4	+ 21 20 42.90
	23	41.71
	10	41.51
il	3	42.38
	4	40.70
	22	42.12
	23	42.09
	12	41.88

δ HYDRÆ ET CRATERIS,
Æ. 11h. 11m. 51s.

	4	− 13 58 2.68
	23	2.19
	10	1.44
il	3	1.32
	4	3.97
	22	1.41
	2	2.12
	12	2.12

β LEONIS—Æ. 11h. 41m. 24s.

	23	+ 15 24 39.28
	10	38.79
	31	38.84
il	3	39.25
	22	39.22
	23	38.17
	2	38.83
	12	38.58
	19	38.37

RSÆ MAJORIS—Æ. 11h. 45m. 55s.

	4	+ 54 31 43.71
	30	44.06
il	4	43.53
	21	44.35
	22	44.92
	2	43.04
	12	43.41
	13	42.71

1860 GROOMBRIDGE, S. P.,
Æ. 12h. 7m. 35s.

	16	+ 84 20 14.13

Æ MINORIS (4166 B. A. C.) S. P.,
Æ. 12h. 14m. 38s.

	16	+ 84 12 24.50
	20	24.39

E MINORIS (4193 B. A. C.) S. P.,
Æ. 12h. 19m. 6s.

	16	+ 84 15 36.21
	20	37.17

β CORVI—Æ. 12h. 26m. 31s.

		° ′ ″
Feb.	4	− 22 33 58.35
Mar.	30	57.29
	31	56.05
Apr.	3	57.83
	22	56.96
May	12	59.39
	13	60.20
	19	57.93

CANUM VENATICORUM—(4345 B. A. C.)
Æ. 12h. 48m. 59s.

Apr.	23	+ 39 7 32.92
May	2	34.08
June	15	33.90

Cor. applied for errors of div. +0″.06.

12 CANUM VENATICORUM,
Æ. 12h. 49m. 0s.

Apr.	23	+ 39 7 46 62
May	2	47.26
June	15	47.20
	17	46.64
July	8	46.65
	10	45.85
	24	46.58

Cor. applied for errors of div. +0″.06.

α VIRGINIS—Æ. 13h. 17m. 18s.

Apr.	3	− 10 22 38.38
	13	35.98
	16	35.95
	18	37.38
May	2	35.45
	13	36.86
	19	36.36
	22	36.52
July	8	36.13
	10	37.32
	14	35.90

η URSÆ MAJORIS—Æ. 13h. 41m. 37s.

Apr.	6	+ 50 3 48.93
	21	49.22
	23	48.52
May	2	49.37
	11	48.44
	12	48.27

η BOOTIS—Æ. 13h. 47m. 32s.

Apr.	3	+ 19 9 5.32
	23	6.86
May	2	7.37
	11	5.95

α BOOTIS—Æ. 14h. 8m. 49s.

Apr.	3	+ 19 57 57.39
	23	55.46
May	2	57.28
	11	57.20
	12	57.42
June	4	55.35
	24	56.78
July	13	55.66
	14	57.21
	24	56.69

ε BOOTIS—Æ. 14h. 38m. 26s.

Apr.	3	+ 27 42 32.92

β URSÆ MINORIS—Æ. 14h. 51m. 12s.

		° ′ ″
Apr.	3	+ 74 46 6.82
	13	6.11
May	11	(4.37)
June	6	6.09
	18	6.06

β URSÆ MINORIS, S. P.

Jan.	10	+ 74 46 4.99
	28	4.75

β LIBRÆ—Æ. 15h. 8m. 56s.

Apr.	3	− 8 49 31.52
	13	34.36
May	11	33.10
June	6	31.10
	18	33.05
	19	32.12

α CORONÆ BOREALIS,
Æ. 15h. 28m. 20s.

Apr.	3	+ 27 13 21.15
May	22	21.35
June	6	22.34
	19	20.42
	22	21.94
July	10	20.44

α SERPENTIS—Æ. 15h. 36m. 53s.

Apr.	3	+ 6 54 5.23
May	11	5.93
	22	3.32
June	19	5.51
	22	6.13
July	6	4.55
	10	3.01

ζ URSÆ MINORIS—Æ. 15h. 49m. 32s.

Apr.	3	+ 78 15 11.87
	13	11.45
May	11	11.48
	22	12.22
	27	12.38
June	6	11.04
	22	11.91
July	6	12.96
	10	12.11

β¹ SCORPII—Æ. 15h. 56m. 43s.

Apr.	3	− 19 23 (22.57)
	13	25.20
May	11	24.34
	27	25.38
June	22	24.08
July	6	25.10
	13	25.42

β² SCORPII—Æ. 15h. 56m. 44s.

Apr.	13	− 19 23 12.61
May	11	11.44
	27	13.74
June	22	10.30
July	6	12.87
	13	12.69

δ OPHIUCHI—Æ. 16h. 6m. 29s.

Apr.	3	− 3 18 12.32
May	27	14.55
June	6	12.13
	16	13.52
July	14	14.08

α SCORPII—Æ. 16h. 20m. 13s.

		° ′ ″
Apr.	3	− 26 5 36.97
May	19	38.44
	27	38.90
June	6	37.24
	16	37.28
	22	36.22
July	6	39.12
	14	38.74
	15	38.07

η DRACONIS—Æ. 16h. 21m. 58s.,
4c′ = +0″.08.

May	11	+ 61 50 17 22

ε URSÆ MINORIS—Æ. 17h. 1m. 31s.

May	19	+ 82 16 30.58
June	6	30.48
July	6	32.31
	14	32.45
	29	29.95

ε URSÆ MINORIS, S. P.

Jan.	10	+ 82 16 31.57
	28	32.70

α HERCULIS—Æ. 17h. 7m. 48s.

Aug.	3	+ 14 33 55.98

β DRACONIS—Æ. 17h. 27m. 3s.

May	19	+ 52 24 52.45
June	6	51.93
	19	52.31
July	6	52.01
	29	51.26
Aug.	3	52.33
	4	52.31
	6	51.67

α OPHIUCHI—Æ. 17h. 27m. 58s.

July	23	+ 12 40 22.56
	31	24.43
Aug.	3	24.67
	8	23.54
	10	23.80

γ DRACONIS—Æ. 17h. 53m. 7s.

May	19	+ 51 30 29.88
June	19	30.54
	22	(32.37)
July	6	31.25
Aug.	4	30.55
	6	29.60
	8	30.40

μ¹ SAGITTARII—Æ. 18h. 4m. 47s.

June	22	− 21 5 (32.08)
July	6	33.62
Aug.	4	34.56
	5	34.50
	8	34.44

Cor. applied for errors of div. +0″.16.

ANONYMOUS—Æ. 18h. 19m. 17s.

Apr.	6	+ 85 40 0.20
June	17	0.44
	22	1.01

δ URSÆ MINORIS—Æ. 18h. 20m. 44s.

		hh.	° ′ ″
May	30	1.3	+ 86 35 50.03
July	31	1.0	49.59
Aug.	3	1.3	49.49

δ URSÆ MINORIS, S. P.

		hh.	
Jan.	28	1.35	+ 86 35 49.78
Feb.	4	1.35	49.21
	23	1.3	48.99
Mar.	3	1.0	48.86
	5	1.0	48.49
	9	1.0	50.02
	10	1.35	49.64
	11	1.0	49.44

α LYRÆ—Æ. 18h. 31m. 51s.

Jan.	4	+ 38 38 49.08
	10	48.05
	12	47.03
	13	48.67
	14	48.85
	18	47.82
	21	49.51
	22	49.10
	23	48.10
	27	48.83
Feb.	3	50.37
	9	48.40
	11	48.63
Apr.	3	49.13
	6	47.75
May	19	51.03
	20	48.01
	21	49.64
	25	49.09
	27	48.06
June	3	49.49
	15	49.46
	17	47.79
	22	49.08
	24	49.34
July	6	48.60
	7	48.57
	8	49.10
	11	48.15
	26	49.25
	31	49.18
Aug.	3	49.53
	4	49.07
	5	48.26
	6	48.08
	8	49.20
	10	48.81
	31	48.81
Sept.	8	48.89
	13	47.12
	14	48.16
Dec.	4	49.93
	14	49.19
	15	49.08
	16	48.11
	21	49.15
	22	48.26
	23	49.99
	26	48.94
	31	49.52

Cor. applied for errors of div. +0″.11.

β LYRÆ—Æ. 18h. 44m. 32s.

May	27	+ 33 11 29.85
June	15	29.50
	22	30.11
July	7	28.85
	8	28.32
	26	28.43
	31	29.94
Aug.	3	29.18

β LYRÆ—Continued.

		° ′ ″
Aug.	4	+ 33 11 28.41
	5	29.37
	6	28.30
	8	28.50
	10	28.59

ζ AQUILÆ—Æ. 18h. 58m. 31s.

May	27	+ 13 38 40.40
June	15	40.53
	22	40.71
July	8	39.65
	31	39.87
Aug.	3	40.78
	4	39.46
	5	39.26
	6	39.97
	8	39.99
	10	39.94
Sept.	2	39.17

η LYRÆ—Æ. 19h. 8m. 39s.

May	37	+ 18 53 27.75
June	22	27.13
Aug.	4	27.39
	5	25.39
	10	25.19

Cor. applied for errors of div. +0″.18.

δ AQUILÆ—Æ. 19h. 17m. 56s.

July	26	+ 2 49 11.17
Aug.	4	11.55
	5	10.67
	6	10.06
	8	11.68
	10	11.24
Sept.	2	11.49

γ AQUILÆ—Æ. 19h. 39m. 8s.

July	8	+ 10 15 5 74
	26	5.19
Aug.	4	4.74
	6	5.02
	8	5.52
	10	5.17
	31	4.22
Sept.	2	4.48
	8	4.84
	25	4.95
Oct.	6	4.93

α AQUILÆ—Æ. 19h. 43m. 28s.

May	27	+ 8 28 34.27
June	15	34.39
July	8	33.47
	24	34.91
	31	33.61
Aug.	4	34.49
	6	(31.77)
	8	32.75
	10	33.64
	31	33.62
Sept.	2	33.42
	8	33.69
	30	33.31
Oct.	6	33.92

β AQUILÆ—Æ. 19h. 47m. 57s.

July	8	+ 6 2 9.53
	24	9.48
	26	9.89
Aug.	4	10.49
	6	8.59
	7	9.39

β AQUILÆ—Continued.

		° ′ ″
Aug.	8	+ 6 2 9.38
	10	9.83
	31	8.95
Sept.	2	8.77
	8	8.47
	25	9.13
Oct.	6	9.42

α¹ CAPRICORNI—Æ. 20h. 9m. 20s.

May	27	— 12 58 2.65
June	15	2.51
July	24	2.92
Aug.	7	4.66
	10	3.79
Sept.	1	4.84
	8	4.56
	25	4.49
	30	3.94

α² CAPRICORNI—Æ. 20h. 9m. 44s.

May	27	— 13 0 19.02
June	15	19.76
July	24	20.11
	26	20.76
Aug.	4	20.72
	7	21.70
	8	21.24
	10	20.75
	31	20.62
Sept.	1	21.46
	8	21.38
	25	21.46
	30	20.85

λ URSÆ MINORIS—Æ. 20h. 13m. 2s.

		hh.	
June	15	1.3	+ 88 51 38.11
July	31	1.0	38.48
Aug.	3	1.35	38.50
Sept.	29	1.3	38.33
Oct.	5	1.3	37.64

λ URSÆ MINORIS, S. P.

		hh.	
Jan.	14	1.3	37.92
Mar.	5	1.0	36.94
	9	1.0	38.99
Apr.	3	1.35	36.80

α CYGNI—Æ. 20h. 36m. 19s.

Jan.	23	+ 44 44 48.94
June	15	47.81
July	24	47.28
	26	47.06
	31	47.13
Aug.	4	47.75
	6	47.20
	7	47.34
	8	47.14
	10	46.13
	11	46.98
	31	47.80
Sept.	1	48.62
	2	47.00
	9	47.03
	29	47.82
Oct.	1	46.33
	6	48.75
	8	47.24
	9	45.78

61¹ CYGNI—Æ. 21h. 0m. 10s.

		° ′ ″
July	24	+ 38 0 53.19
	26	51.24
	29	53.11
	31	52.67
Aug.	3	52.27
	4	51.36
	5	(53.69)
	7	52.24
	8	51.39
	11	51.90
	31	51.61
Sept.	1	52.58
	2	52.34
	8	51.31
	25	52.32
	29	51.51
Oct.	5	(50.59)
	6	51.36
	7	51.69
	8	51.18
	9	52.30
	19	52.31
	26	51.31
	29	51.63

61² CYGNI—Æ. 21h. 0m. 2s.

July	24	+ 38 0 49.63
	29	48.41
Aug.	3	47.96
	5	(50.23)
	7	47.66
Sept.	25	47.95
	29	47.66
Oct.	5	(45.20)
	7	47.84
	8	47.90
	19	47.94
	26	47.93
	29	47.29

ζ CYGNI—Æ. 21h. 6m. 33s.

July	29	+ 29 36 49.83
Aug.	3	51.60
	7	49.82
	31	50.87
Sept.	1	50.31
	2	50.49
	8	50.47
	25	50.87
Oct.	1	50.68
	9	50.06
	29	51.25

α CEPHEI—Æ. 21h. 15m. 0s.

July	24	+ 61 57 4.17
	26	3.46
	31	4.89
Aug.	31	5.27
Sept.	1	4.02
	8	5.93
	29	3.77
Oct.	2	3.59
	6	5.27
	7	4.45
	24	4.60
	26 (ref.)	7.14
	26	4.56
	29	5.80

β AQUARII—Æ. 21h. 23m. 39s.

July	26	— 6 13 41.99
	29	42.11
Aug.	7	42.14
Sept.	1	40.59

β AQUARII—Continued.

			°	′	″
t.	2	—	6	13	41.03
	25				42.01
	29				42.44
,	7				42.10
	8				42.93
	9				42.14
	29				41.81

β CEPHEI—Æ. 21h. 26m. 42s.

r	31	+	69	54	9.88
g.	7				8.83
	31				10.00
t.	8				10.46
.	5				9.41
	6				10.01
	10				10.03
	19				9.49
	24				9.26
	26				9.84

β CEPHEI, S. P.

r.	4	+	69	52	7.90

ε PEGASI—Æ. 21h. 36m. 49s.

y	26	+	9	11	23.16
	29				22.45
	31				24.34
g.	7				21.82
	18				21.93
	31				23.81
t.	1				22.94
	2				22.75
	8				22.37
	25				21.89
	29				23.11
.	5				21.86
	6				23.64
	7				22.26
	8				22.37
	9				21.39
	10				23.24
	24				23.21
	26				22.94
	29				22.95

AQUARII, (7648, B. A. C.)
Æ. 21h. 50m. 19s.

			°	′	″
Oct.	24	—	13	22	48.08
	25				48.78
	26				47.84
	28				47.57
	29				49.10
Nov.	9				48.44
	21				47.07
	23				47.12
Dec.	3				48.92

WEISSE XXI. 1223–Æ. 21h. 52m. 19s.

Oct.	28	—	13	34	10.92
	29				15.17
Nov.	21				11.80

WEISSE XXI. 1240—Æ. 21h. 53m. 0s.

Nov.	9	—	13	44	28.10

α AQUARII—Æ. 21h. 58m. 4s.

July	26	—	1	2	47.16
	29				47.25
Oct.	9				47.35
	19				46.09
Dec.	4				45.62

LACERTÆ, (7765,) B. A. C.,
Æ. 22h. 7m. 27s.

Oct.	10	+	38	58	21.90
	19				21.29
	28				21.99
	29				20.93
Nov.	21				22.16
	30				21.76
Dec.	4				22.03

Cor. applied for errors of div. +0″.13.

ζ PEGASI—Æ. 22h. 33m. 59s.

July	31	+	10	2	60.59
Aug.	7				58.53

ζ PEGASI—Continued.

			°	′	″
Sept.	1	+	10	2	58.84
	7				59.24
	9				60.21
Oct.	10				61.69
	23				58.65
Nov.	9				60.12
	16				59.95
	21				61.17
	30				60.76
Dec.	4				61.43

α PISCIS AUSTRALIS—Æ. 22h. 49m. 21s.

July	31	—	30	24	57.29
Aug.	7				57.37
	12				58.01
	18				56.91
Sept.	1				57.78
	7				56.62
	8				58.67
	9				56.71
	25				58.34
	28				56.03
	29				58.37
Oct.	5				57.36
	9				56.21
	23				58.70
	29				57.30
Nov.	9				58.43
	16				55.58
	21				55.82
	30				56.25
Dec.	3				54.98
	4				57.01

α PEGASI—Æ. 22h. 57m. 17s.

July	31	+	14	23	57.60
Aug.	7				56.63
	18				56.69
Sept.	9				57.77
	25				56.21
Oct.	23				56.88
Nov.	9				57.71
	16				58.09

ι PISCIUM—Æ. 23h. 32m. 14s.

			°	′	″
Dec.	12	+	4	48	51.58

γ CEPHEI—Æ. 23h. 33m. 14s

Feb.	3	+	76	47	43.80
	4				45.24
	10				44.00
July	29				42.14
Sept.	7				43.23
	9				43.57
	14				43.93
	25				43.59
	29				41.79
Oct.	5				(51.83)
	7 (ref.)				43.65
	7				43.90
	9 (ref.)				46.67
	9				42.86
	23				43.53
Nov.	9				41.92
	30				42.94
Dec.	2				43.20
	3 (ref.)				45.28
	3				43.51

γ CEPHEI, S. P.

Feb.	23	+	76	46	42.16
Mar.	10				42.20
	30				44.25
Apr.	3				42.04
	4				41.58
May	12				43.26
	13				43.10
	19				43.57

ANONYMOUS—Æ. 23h. 54m. 25s.

Sept.	29	—	0	25	12.09
Oct.	23				12.31

ANONYMOUS—Æ. 23h. 59m. 28s.

Oct.	23	—	0	29	43.43

MEAN PLACES OF STARS

OBSERVED WITH

THE MERIDIAN CIRCLE,

FOR 1850-0.

NATIONAL OBSERVATORY.

α ANDROMEDÆ.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	13 . .	0 0 38.83	+28 15 45.50
	21 . .	38.65	45.24
Apr.	15 . .	38.82	43.81
	17 . .	38.65	44.28
	19 . .	38.46	43.97
	21 . .	(38.26)	43.24
May	3 . .	38.37	44.75
July	24 . .	38.37	45.53
	29 . .	38.46	
Aug.	6 . .	38.48	42.82
	13 . .	38.43	42.53
	28 . .	38.38	45.84
Sept.	1 . .	38.51	43.16
	5 . .	38.49	44.82
	8 . .	38.75	44.48
	25 . .	38.65	44.38
	29 . .	38.59	43.90
Oct.	7 . .	38.71	45.72
	9 . .	38.54	47.00
	21 . .	38.63	
	23 . .	38.66	44.35
	29 . .	38.59	45.30
Nov.	16 . .	38.76	46.86
	17 . .	38.35	42.16
	30 . .	38.54	47.61
Dec.	9 . .	38.44	44.26

γ PEGASI.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	5 . .	0 5 30.90	+14 20 56.19
Sept.	8 . .	31.10	58.12
Oct.	5 . .	30.98	58.31
	7 . .	30.80	59.09
	9 . .	30.99	58.80
	16 . .	30.91	
	21 . .	31.02	
	28 . .	31.07	58.85
	29 . .	31.03	57.47
Nov.	17 . .	31.17	58.74
	30 . .	31.08	62.32
Dec.	9 . .	30.82	58.55
	26 . .	31.01	59.04

WEISSE O, 368.

		Æ. h. m. s.	Dec. ° ′ ″
Sept.	25 . .	0 22 9.72	— 1 9 4.89

WEISSE O, 479.

		Æ. h. m. s.	Dec. ° ′ ″
Sept.	25 . .	0 27 50.70	— 1 19 46.65

CETI, 163.

		Æ. h. m. s.	Dec. ° ′ ″
Sept.	25 . .	0 30 24.43	— 1 19 42.78

α CASSIOPEIÆ.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	13 . .	0 32 1.37	+55 42 49.83
Feb.	5 . .	1.47	51.33
	9 . .	1.40	51.55
	10 . .	1.82	48.57
	12 . .	1.50	50.93
	13 . .	1.48	49.89
March	5 . .	1.73	52.37
April	14 . .	1.70	46.97
Sept.	8 . .	1.74	51.41
Oct.	16 . .	1.81	
Nov.	16 . .	1.48	54.04
	30 . .	1.39	47.23

α CASSIOPEIÆ, S. P.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	4 . .	0 32 0.95	+55 42 44.80
	11 . .	1.69	41.64
	23 . .	1.35	49.82

β CETI.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	13 . .	0 36 3.49	—18 48 37.70
Sept.	13 . .	3.19	
	24 . .	3.35	39.14
Oct.	5 . .	3.39	40.91
	7 . .	3.49	38.04
	8 . .	3.38	39.78
	11 . .	3.23	
	16 . .	3.25	
Nov.	21 . .	3.39	36.08
	30 . .	3.64	37.18
Dec.	4 . .	3.35	(35.14)
	9 . .	3.17	37.13
	19 . .		40.85
	26 . .	3.42	40.10

WEISSE O, 712.

		Æ. h. m. s.	Dec. ° ′ ″
Sept.	25 . .	0 40 39.65	— 1 18 26.44

POLARIS.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	5 . .	1 4 60.65	+88 30 32.41
	8 . .	59.83	32.67
	13 . .	61.12	33.98
	14 . .	58.59	36.22
	19 . .	60.38	36.02
	23 . .	63.63	33.93
	24 . .	61.88	34.37
	26 . .	57.77	35.11
	28 . .	60.69	36.25
Feb.	3 . .	60.08	36.44
	5 . .	61.47	34.87
	9 . .	62.10	32.50

POLARIS—Continued.

		Æ. h. m. s.	De ° ′
Feb.	10 . .	1 4 60.58	+88 30
	12 . .	60.42	
	13 . .	61.06	
	18 . .	59.16	
	21 . .	61.04	
	23 . .	63.31	
	26 . .	59.41	
March	4 . .		
	5 . .	60.48	
	7 . .	(67.44)	
	9 . .	61.88	
	12 . .		
	18 . .	61.74	
	30 . .	56.68	
April	1 . .	59.02	
	3 . .	60.38	
	6 . .	65.24	
	8 . .	62.24	
	9 . .	61.35	
	13 . .	60.90	
	14 . .	61.54	
	15 . .	59.26	
	17 . .	62.56	
	19 . .	63.00	
	20 . .	61.27	
	26 . .	59.80	
	29 . .	61.91	
	30 . .	61.39	
May	3 . .	62.80	
	11 . .	63.03	
	18 . .	60.97	
	19 . .	62.05	
	20 . .	64.20	
July	24 . .	62.97	
Aug.	6 . .	60.74	
Sept.	5 . .	(65.56)	
	8 . .	(65.37)	
	13 . .	60.56	
	14 . .	63.85	
	16 . .	59.82	
	22 . .	59.68	
	23 . .	63.32	
	24 . .	61.56	
	25 . .	60.95	
	29 . .	63.05	
Oct.	5 . .	59.81	
	7 . .	60.23	
	8 . .	61.81	
	11 . .	(62.71)	
	16 . .	62.63	
	21 . .	60.97	
	29 . .	59.59	
Nov.	15 . .	62.60	
	17 . .	59.85	

POLARIS—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
	21 . .	1 4 63.71	+88 30 37.32
	9 . .	60.05	35.89
	19 . .	62.31	34.64
	26 . .	63.15	36.28

POLARIS, S. P.

		Æ. h. m. s.	Dec. ° ′ ″
	23 . .	1 4 55.68	+88 30 38.44
	4 . .	59.88	36.44
	11 . .	63.70	35.71
	23 . .	60.17	38.33
	25 . .	59.00	37.51
ch	5 . .	(53.90)	37.34
	30 . .	62.69	35.18
l	2 . .	60.33	. . .
	3 . .	63.82	36.67
	4 . .	61.57	. . .
	6 . .	58.60	31.87
	9 . .	64.64	. . .
	13 . .	(55.52)	38.88
	16 . .	62.88	36.97
	17 . .	(66.31)	36.22
	18 . .	64.08	37.53
	21 . .	59.13	35.20
	22 . .	58.61	34.61
	23 . .	62.56	34.67
	27 . .	61.88	37.72
	2 . .	60.82	37.27
	12 . .	58.36	35.67
	13 . .	62.53	35.71
	21 . .	63.60	(39.16)
	4 . .	61.24	38.09
	6 . .	58.78	35.55
	15 . .	64.26	36.53
	17 . .	62.20	32.85
	1 . .	61.98	34.42
	6 . .	65.48	35.38
	7 . .	59.75	35.28
	9 . .	60.50	35.98
	11 . .	62.46	34.11
	14 . .	60.62	35.97
	24 . .	64.38	33.55
	4 . .	62.23	34.65
	11 . .	59.12	35.45
	13 . .	64.39	36.31
	4 . .	(66.42)	. . .
	5 . .	63.74	35.18
	16 . .	59.19	33.39
	21 . .	62.83	35.08
	23 . .	64.65	34.77
	24 . .	(66.85)	36.27
	25 . .	63.81	35.08
	29 . .	64.96	36.18
	25 . .	55.88	

ϑ¹ CETI.

		Æ. h. m. s.	Dec. ° ′ ″
Nov.	19 . .	1 16 32.00	— 8 57 32.59
Dec.	12 . .	31.79	31.90

α ARIETIS.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	19 . .	1 58 43.75	+22 45 2.18
	23 . .	43.81	1.23
	26 . .	43.77	3.94
	28 . .	43.65	3.14
Feb.	23 . .	43.80	2.07
March	5 . .	43.86	2.43
Sept.	14 . .	43.58	3.66
	15 . .	43.42	. . .
Oct.	16 . .	43.61	. . .
Dec.	4 . .	43.68	5.00

γ CETI.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	5 . .	2 35 31.97	+ 2 36 2.08
	8 . .	31.98	5.38
	10 . .	31.91	4.06
	12 . .	32.03	2.58
	14 . .	32.03	(7.40)
	19 . .	31.98	0.08
	23 . .	32.05	2.46
	24 . .	31.82	5.26
	26 . .	32.01	4.62
Feb.	3 . .	32.06	4.90
Sept.	14 . .	31.77	4.25
Oct.	19 . .	31.96	. . .
Nov.	21 . .	31.90	3.25
Dec.	12 . .	32.08	1.54
	26 . .	31.92	0.24

α CETI.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	5 . .	2 54 26.60	+ 3 29 52.02
	8 . .	26.74	51.98
	12 . .	26.48	51.06
	13 . .	26.60	51.26
	14 . .	26.65	56.10
	19 . .	26.65	53.12
	22 . .	(26.87)	53.52
	23 . .	26.55	52.72
	24 . .	26.67	52.39
	26 . .	26.61	53.63
Feb.	3 . .	26.59	55.02
Sept.	16 . .	(26.27)	53.85
Dec.	12 . .	26.53	52.85

α PERSEI.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	5 . .	3 13 38.25	+49 19 19.18
	8 . .	38.57	20.07

α PERSEI—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	10 . .	3 13 (38.07)	+49 19 18.33
	12 . .	38.34	20.35
	14 . .	38.24	(25.74)
	19 . .	(37.65)	23.59
	22 . .	38.21	20.98
	23 . .	38.34	21.28
	24 . .	38.43	20.36
	26 . .	38.19	20.97
Feb.	3 . .	38.12	21.78
	5 . .	38.42	21.70
	9 . .	38.60	19.42
	12 . .	38.37	20.91
	18 . .	38.42	23.15
March	5 . .	38.62	22.37
April	16 . .	38.48	20.49
June	4 . .	38.65	21.48
Sept.	14 . .	38.41	20.51

η TAURI.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	5 . .	3 38 34.61	+23 38 11.11
	8 . .	34.53	15.80
	10 . .	34.42	10.44
	12 . .	34.72	16.32
	13 . .	34.55	14.73
	14 . .	34.60	16.56
	19 . .	. . .	14.49
	22 . .	34.59	13.47
	24 . .	34.74	14.69
	26 . .	34.63	13.24
Feb.	3 . .	(35.08)	14.85
	5 . .	34.65	15.54
	9 . .	34.64	13.40
	12 . .	34.72	14.84
	13 . .	34.69	14.17
	18 . .	34.67	18.02
March	5 . .	34.66	16.50

γ¹ ERIDANI.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	8 . .	3 51 1.87	—13 56 22.36
	10 . .	1.92	21.41
	12 . .	1.78	19.49
	13 . .	1.94	21.62
	19 . .	2.01	16.91
	22 . .	1.97	19.48
	23 . .	1.99	20.59
	24 . .	1.97	21.52
	26 . .	1.88	19.82
Feb.	18 . .	2.06	16.97
March	5 . .	1.86	20.37
Dec.	9 . .	1.69	16.44
	12 . .	1.93	19.58

α TAURI.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	5	4 27 19.16	+16 12 9.58
	7	19.09	11.20
	8	19.18	12.16
	10	19.10	9.50
	12	19.11	12.73
	19	(18.76)	13.00
	22	19.09	9.77
	23	18.97	11.75
	24	19.09	11.89
Feb.	4	19.11	10.98
	9	19.28	11.15
	12	19.35	13.60
	13	19.05	12.04
	16	19.12	13.26
	18	19.08	15.17
	26	18.92	11.75
March	5	19.13	12.05
July	6	19.13	11.71
	10	18.99	12.34
Nov.	16	18.98	13.64
Dec.	12	19.05	11.60

BESSEL'S ZONE, 513.

Feb.	18	5 0 10.96	+29 36 3.50

α AURIGÆ.

Jan.	5	5 5 37.02	+45 50 17.78
	7	37.26	21.36
	12	37.03	20.28
	13	37.23	19.33
	23	37.07	19.76
Feb.	9	37.35	20.00
	12	37.13	20.89
	13	36.97	20.02
	16	37.01	21.56
	23	36.87	18.83
	26	37.14	19.02
March	3	37.17	22.04
	5	36.88	21.27
	7	(37.60)	21.04
April	30	36.98	19.73
May	12	36.75	22.67
	21	36.75	23.45
June	18	37.05	21.36
July	6	36.85	18.73
	10	37.01	18.71
	23	. .	24.47

β ORIONIS.

Jan.	8	5 7 19.69	— 8 22 42.98
	10	19.57	45.03

β ORIONIS—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	19	5 7 19.95	— 8 22 45.68
	22	19.93	42.87
	24	19.81	45.94
Feb.	5	19.92	44.73
July	6	19.69	44.54
	10	19.92	44.03
Sept.	24	19.53	43.01

β TAURI.

Jan.	5	5 16 48.75	+28 28 30.56
	7	48.80	31.47
	8	48.83	35.99
	10	48.85	29.47
	13	(48.26)	28.08
	19	48.99	32.55
	22	48.82	30.63
	23	48.88	30.91
	24	48.87	31.52
Feb.	9	48.92	27.05
	12	48.98	30.59
	16	48.94	30.38
	23	48.84	30.51
	26	49.00	33.09
March	3	49.05	32.52
	5	48.82	33.83
	7	48.82	33.69
Oct.	28	48.90	(37.59)

δ ORIONIS.

Jan.	7	5 24 20.67	— 0 24 54.53
	8	20.64	50.08
	10	20.72	53.59
	12	20.61	52.45
	22	20.74	54.36
	23	29.62	53.75
	24	20.65	54.19
Feb.	4	20.73	53.45
	9	20.86	56.29
	18	20.65	50.14
	26	20.77	53.76
March	3	20.87	52.16
	5	20.61	50.98
	7	20.73	48.59
April	30	20.67	53.10
May	19	20.71	52.88
	21	20.63	49.35

α LEPORIS.

Jan.	5	5 26 7.04	—17 56 3.34
	13	7.11	2.77
	19	7.03	0.48

α LEPORIS—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	5	5 26 7.04	—17 56 1.95
	16	6.93	1.02
	23	6.82	2.73
Sept.	15	6.89	. . .
Oct.	28	6.96	. . .

ε ORIONIS.

Jan.	7	5 28 36.24	— 1 18 8.60
	10	(35.21)	10.09
	23	36.10	6.81
Feb.	4	36.21	8.00
	9	36.26	8.70
April	30	36.27	5.79
Sept.	15	36.20	. . .
Oct.	28	36.25	. . .

BESSEL'S ZONE, 513.

Feb.	18	3 32 53.97	+29 46 16.94
March	3	54.37	18.78

α COLUMBÆ.

Jan.	5	5 34 13.22	+34 9 28.01
	7	13.16	30.75
	8	13.02	25.36
	10	12.82	27.64
	13	13.13	(31.76
	19	13.19	26.12
	23	13.08	27.73
Feb.	4	13.14	28.42
	9	13.11	25.94
	12	13.08	25.70
	16	13.11	26.36
	23	13.19	26.72
	26	13.02	28.63
March	5	(12.78)	24.62
	7	13.01	25.85
Oct.	28	13.17	(21.51)

BESSEL'S ZONE, 513.

March	3	5 39 42.45	+29 40 13.71

κ ORIONIS.

April	30	5 40 38.65	— 9 43 57.84
May	19	38.48	37.12

α ORIONIS.

Jan.	5	5 46 3.22	+ 7 22 25.9
	7	3.04	26.8
	10	3.02	26.12

α ORIONIS—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
.	12 . .	5 46 3.34	+ 7 22 22.94
	13 . .	3.05	23.18
	19 . .	3.18	28.72
	23 . .	3.25	28.64
	24 . .	3.10	27.82
.	4 . .	3.23	26.91
	9 . .	3.06	28.52
	12 . .	3.16	28.98
	16 . .	3.17	28.20
	18 . .	3.13	(34.19)
	23 . .	3.08	26.73
	26 . .	3.05	29.57

κ AURIGÆ.

.	18 . .	6 5 49.19	+29 32 56.43
	23 . .	49.20	51.32
ch	3 . .	49.49	53.46

μ GEMINORUM.

	19 . .	6 13 53.02	+22 35 5.51
.	26 . .	53.29	8.00
ch	5 . .	53.28	(11.56)

51 (HEV.) CEPHEI.

	21 . .	6 28 32.19	+87 15 18.13
	26 . .	37.24	21.24

51 (HEV.) CEPHEI, S. P.

.	19 . .	6 28 31.98	

AURIGÆ, 2182.

	18 . .	6 32 9.89	+44 39 46.51
ch	3 . .	10.20	44.52

BESSEL'S ZONE, 511.

	5 . .	6 38 32.08	+43 55 13.29
	11 . .	32.05	13.30
	16 . .	32.30	16.16

α CANIS MAJORIS.

	5 . .	6 38 32 47	—16 30 48.78
	7 . .	32.41	51.81
	10 . .	32.36	50.07
	13 . .	32.38	51.79
	19 . .	(31.10)	47.28
	23 . .	32.44	51.96
.	3 . .	32.45	54.36
	4 . .	32.41	49.58
rch	5 . .	32.20	52.03

α CANIS MAJORIS—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
March	17 . .	6 38 32.32	—16 30 . . .
June	24 . .	32.78	45.10

ε CANIS MAJORIS.

Jan.	7 . .	6 51 43.89	—28 46 19.65
	13 . .	43.95	20.56
	19 . .	43.68	16.63
Feb.	3 . .	44.06	16.15
	4 . .	43.93	17.44
	18 . .	43.76	17.29
	21 . .	43.86	18.26
	23 . .	43.84	19.22
	26 . .	43.86	19.72
March	3 . .	43.85	20.07
	5 . .	43.58	17.56
	9 . .	43.70	21.10

BESSEL'S ZONE, 511.

Feb.	11 . .	6 56 57.73	+42 57 54.65

ANONYMOUS.

Feb.	11 . .	7 6 29.39	+41 51 24.31

δ GEMINORUM.

Jan.	13 . .	7 11 9.70	+22 15 11.72
Feb.	3 . .	9.76	12.98
	4 . .	9.64	13.37
	23 . .	9.77	12.11
	26 . .	9.81	12.06
March	7 . .	9.88	13.69
	9 . .	9.84	14.34

ANONYMOUS.

March	3 . .	7 12 12.90	+45 15 27.6

ANONYMOUS.

Feb.	18 . .	7 14 2.80	+45 7 16.76
March	3 . .	3.26	. . .

ANONYMOUS.

Feb.	11 . .	7 20 53.43	+40 39 54 03

BESSEL'S ZONE, 452.

Feb.	4 . .	7 21 35.21	+40 44 45.93

BESSEL'S ZONE, 492.

Feb.	18 . .	7 24 58.59	+41 47 8.91
March	3 . .	58.71	4.58

α^2 GEMINORUM.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	13 . .	(7 25 1.75)	+32 12 42.80
	23 . .	1.49	41.83
Feb.	3 . .	1.39	41.34
	11 . .	1.35	43.58
	13 . .	1.48	43.62
	16 . .	1.56	44.67
	21 . .	1.46	43.98
	23 . .	1.50	42.87
	26 . .	1.35	44.24
March	5 . .	1.58	45.14
	9 . .	1.68	45.38

α CANIS MINORIS.

Jan.	23 . .	7 31 26.98	+ 5 36 21.40
Feb.	3 . .	26.91	22.10
	4 . .	26.61	21.11
	11 . .	26.83	21.41
	13 . .	26.89	21.43
	16 . .	27.06	20.89
	21 . .	26.89	19.41
	23 . .	26.90	20.64
March	9 . .	26.88	20.32

β GEMINORUM.

Jan.	13 . .	7 36 7.84	+28 22 57.17
Feb.	3 . .	7.88	61.22
	11 . .	7.76	60.93
	13 . .	7.95	61.52
	21 . .	7.77	60.60
	23 . .	7.99	59.97
	26 . .	(7.34)	60.11
March	3 . .	8.08	64.64
	5 . .	8.07	61.50
April	3 . .	7.76	62.01

ANONYMOUS, S. P.

March	17 . .	19 38 52.01	+60 9 27.68

ANONYMOUS.

Feb.	4 . .	7 42 (28.98)	+38 19 6.07
	11 . .	30.22	5.78

15 ARGUS.

Jan.	13 . .	8 0 9.35	—23 52 34.50
	23 . .	9.40	29.95
Feb.	11 . .	9.33	27.27
	21 . .	9.49	33.67
	26 . .	9.13	31.39
March	3 . .	9.59	33.66

15 ARGUS—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
March	5 . .	8 0 (10.04)	—23 52 28.49
	9 . .	9.27	30.93
April	1 . .	9.56	30.70
	3 . .	9.39	30.48
	15 . .	9.44	29.49

BESSEL'S ZONE, 401.

Feb.	4 . .	8 24 43.07	+31 23 19.73

HYDRÆ, 2889.

March	9 . .	8 27 52.16	+ 7 9 5.56

HYDRÆ, 2929.

April	4 . .	8 32 55.51	—21 58 . . .

ε HYDRÆ.

Jan.	23 . .	8 38 49.87	+ 6 57 58.46
Feb.	3 . .	49.64	56.04
	4 . .	49.70	57.96
	11 . .	49.75	55.38
	26 . .	49.86	58.92
March	3 . .	(50.14)	57.72
	5 . .	49.99	56.87
	17 . .	49.78	59.70
April	1 . .	49.74	59.80
	3 . .	49.93	56.46
	4 . .	49.69	. . .
	6 . .	49.83	55.88
	15 . .	49.92	57.38

ι URSÆ MAJORIS.

Jan.	23 . .	8 48 (53.81)	+48 37 34.32
Feb.	3 . .	54.75	34.95
	23 . .	54.68	33.69
March	5 . .	(55.13)	36.48
	9 . .	54.94	35.13
April	1 . .	54.76	31.62
	3 . .	54.67	35.82
	6 . .	54.97	33.74
	15 . .	54.90	33.43
	19 . .	54.71	34.83

BESSEL'S ZONE, 344, 345.

Feb.	4 . .	8 49 59.18	+24 32 32.24
	11 . .	59.29	32.81

WEISSE VIII, 1529.

April	16 . .	9 0 5.42	—12 42 27.82

CANCRI, 3115.

		Æ. h. m. s.	Dec. ° ′ ″
April	19 . .	9 0 37.26	+18 4 27.57

HYDRÆ, 3124.

April	4 . .	9 2 15.59	— 8 11 . . .

α HYDRÆ.

Feb.	4 . .	9 20 12.98	— 8 0 40.33
	11 . .	12.90	40.79
	23 . .	12.89	40.81
March	5 . .	12.81	40.81
	9 . .	12.91	38.96
April	1 . .	13.18	38.84
	3 . .	13.08	38.34
	4 . .	12.98	. . .
	9 . .	13.03	. . .
	16 . .	13.00	40.84
	19 . .	12.82	36.86
	20 . .	13.12	37.75
May	11 . .	12.98	39.99

θ URSÆ MAJORIS.

April	6 . .	9 22 47.61	+52 21 22.61

ε LEONIS.

Jan.	13 . .	9 37 19.72	+24 27 43.28
	23 . .	19.77	45.82
Feb.	4 . .	. .	45.90
	10 . .	19.75	42.87
	11 . .	19.76	44.68
	23 . .	(19.10)	44.29
March	9 . .	19.83	(47.98)
	30 . .	19.71	43.56
April	1 . .	19.77	45.01
	2 . .	19.76	. . .
	3 . .	. .	44.55
	4 . .	19.76	. . .
	9 . .	19.86	. . .
	16 . .	19.69	43.12
May	3 . .	(20.18)	45.76
	11 . .	19.88	44.69

α LEONIS.

Jan.	23 . .	10 0 22.68	+12 41 54.63
Feb.	4 . .	22.83	54.32
	10 . .	22.80	52.65
	11 . .	22.63	53.67
	12 . .	22.95	59.31
	23 . .	22.72	53.77
March	9 . .	22.92	(59.30)

α LEONIS—Continued

		Æ. h. m. s.	Dec. ° ′
March	17 . .	10 0 22.76	+12 41 5
	30 . .	22.68	5
April	1 . .	22.92	5
	2 . .	22.76	.
	4 . .	22.74	.
	9 . .	22.87	.
	16 . .	22.82	5
May	3 . .	22.86	.
	11 . .	22.73	5
Aug.	4 . .	22.48	(5
Sept.	3 . .	22.71	.
	13 . .	22.64	5
	15 . .	22.50	5
	20 . .	22.55	5
	21 . .	22.86	.
	24 . .	22.91	5

SEXTANTIS, 3492.

April	21 . .	10 6 39.85	— 7 15

α ANTLIÆ.

April	21 . .	10 20 17.56	—30 17

LEONIS MINORIS, 3640.

April	21 . .	10 30 16.03	+32 45

LEONIS MINORIS, 3728.

April	21 . .	10 44 54.75	+35 1

α URSÆ MAJORIS.

Jan.	13 . .	(10 54 26.43)	+62 33 3
	23 . .	25.68	3
Feb.	4 . .	25.55	3
	11 . .	25.61	3
	23 . .	25.62	3
	25 . .	25.66	3
March	30 . .	25.44	3
April	1 . .	25.62	3
	4 . .	25.73	.
	9 . .	(25.30)	.
	21 . .	25.57	3
	22 . .	25.58	3
	27 . .	25.72	3
May	2 . .	25.51	3
	3 . .	25.43	3
	11 . .	25.60	.
	12 . .	25.72	3
Sept.	21 . .	(25.90)	3

α Ursæ Majoris, S. P.

		Æ. h. m. s.	Dec. ° ′ ″
	31	10 54 25.57	+62 33 31.17
	7	. . .	34.26

δ Leonis.

	4	11 6 7.56	+21 20 41.62
	23	7.48	40.39
	25	7.48	40.09
ch	5	7.48	40.86
	17	7.71	41.56
	30	7.33	42.48
l	2	7.54	. . .
	4	7.51	. . .
	9	7.57	. . .
	21	7.50	42.48
	22	7.48	41.66
	27	7.50	40.92
	2	7.49	42.05
	3	7.55	41.71
	4	7.44	41.88
	11	7.53	42.61
	12	7.62	42.63
	13	7.34	43.65

δ Hydræ et Crateris.

	11	11 11 50.88	—13 58 2.82
	23	50.65	4.69
ch	30	50.57	3.11
il	21	50.49	1.72
	22	50.79	2.60
	2	50.69	2.28
	3	50.81	5.00
	4	50.59	3.75
	11	50.71	1.74
	12	50.71	. . .
	13	50.64	2.50
	20	50.75	3.20

Anonymous, S. P.

	4	11 19 17.61	+66 5 49.93
	12	17.35	46.85

Leonis, 3964.

y	20	11 32 58.74	+22 11 12.37

Anonymous, S. P.

y	2	11 41 13.13	+63 18 41.79

β Leonis.

b.	23	11 41 24.42	+15 24 36.34

β Leonis—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	25	11 41 24.42	+15 24 35.05
March	30	24.51	41.21
April	2	24.35	. . .
	4	24.49	. . .
	22	24.37	39.03
May	3	24.39	37.77
	13	24.21	. . .
	20	24.25	. . .

Anonymous, S. P.

May	2	11 43 40.54	+63 9 4.88

γ Ursæ Majoris.

Feb.	4	11 45 54.97	+54 31 41.55
	11	54.82	43.25
	23	55.17	40.06
	25	54.98	38.48
March	17	55.18	44.38
	30	55.12	42.76
April	3	54.86	45.15
	9	55.18	. . .
	10	55.02	41.48
	21	55.01	43.47
	22	55.07	44.47
May	13	55.01	46.18
	20	54.88	42.09

ε Corvi.

April	21	12 2 25.50	—21 47 16.07

δ Corvi.

May	13	12 22 6.57	—15 40 46.73

β Corvi.

Feb.	4	12 26 31.09	—22 33 55.77
	11	31.20	57.69
	25	30.95	59.99
March	17	30.84	61.70
	30	31.01	57.01
April	2	31.08	. . .
	3	30.97	60.03
	6	31.05	61.11
	13	30.80	59.65
	22	30.84	56.55
May	12	30.92	58.26
	19	30.87	59.41
June	6	30.90	59.92
	15	30.97	59.15
July	26	30.86	. . .

12 Canum Venaticorum.

		Æ. h. m. s.	Dec. ° ′ ″
April	3	12 49 0.19	+39 7 44.07
	6	0.17	42.25
	13	0.36	. . .
	16	0.30	45.23
	18	0.22	44.89
	22	0.33	49.41
May	2	0.34	45.78
	12	0.29	47.67
	21	0.22	44.85
June	4	0.24	46.44
	15	0.17	. . .
	17	0.17	44.17
July	1	0.19	47.98
	24	0.13	47.04
Aug.	4	0.22	48.09
	11	0.21	44.97
	13	0.19	

α Virginis.

Feb.	11	13 17 17.95	—10 22 36.00
April	3	18.03	36.39
	6	17.84	38.96
	13	17.85	37.95
	16	18.04	37.20
	18	17.89	37.83
	22	17.94	32.87
May	2	(17.43)	35.57
	3	17.77	. . .
	12	17.77	34.66
	21	17.92	37.70
June	4	17.59	. . .
	15	17.96	39.00
	17	17.70	39.62
July	1	17.81	38.38
	24	18.01	34.73
Aug.	4	17.86	36.50
	13	17.59	35.17

η Ursæ Majoris.

Feb.	23	13 41 37.44	+50 3 47.25
	25	37.40	48.67
April	6	(37.64)	47.01
	17	37.44	49.50
	21	37.51	49.44
	22	37.35	50.55
	23	37.20	49.63
	27	37.47	47.27
May	2	37.32	44.88
	12	37.48	46.68
June	4	37.61	46.06
July	7	37.37	47.03
Sept.	5	37.54	47.80
	16	37.32	50.11

η Bootis.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	25	13 47 32.56	+19 9 9.06
April	4	32.56	. . .
	6	32.66	5.43
	21	32.58	. . .
	22	32.63	9.96
	23	32.36	5.96
May	11	32.77	6.47
June	4	32.64	6.35
Sept.	4	32.56	. . .
	5	32.47	8.65

α Bootis.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	23	14 8 49.31	+19 57 58.40
April	2	49.24	. . .
	4	49.28	. . .
	6	49.29	54.38
	23	48.93	56.55
	24	49.12	56.39
	27	49.26	55.27
May	2	49.24	55.44
	4	49.12	60.28
	11	49.37	51.05
	12	49.44	53.82
June	4	49.25	55.75
	6	49.22	. . .
	7	49.27	57.24
	9	49.13	56.12
	13	49.23	56.99
Sept.	5	49.27	57.60
	24	49.48	57.59
Oct.	23	(49.65)	53.60

ε Bootis.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	25	14 38 26.19	+27 42 34.74
April	24	26.15	33.55
May	4	26.20	36.40
	13	26.12	. . .
June	2	26.18	29.52
July	6	26.02	. . .
	26	26.11	. . .

α² Libræ.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	23	14 42 35.47	—15 24 53.95
	25	35.31	53.39
April	4	35.38	. . .
	24	35.22	54.54
May	4	35.20	54.37
	12	35.34	54.95
	13	35.33	57.03
June	2	35.19	56.72
	24	34.34	55.92

α² Libræ—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
July	6	14 42 35.42	—18 24 55.51
	13	35.30	53.36
	26	35.25	54.72

Anonymous.

		Æ. h. m. s.	Dec. ° ′ ″
July	15	14 43 16.19	—13 40 39.03

Libræ, 4923.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	23	14 48 42.75	—20 43 58.14

β Ursæ Minoris.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	11	14 51 10.87	+74 44 4.74
	25	11.77	6.74
April	3	11.90	5.65
	24	12.04	4.20
May	3	11.83	3.90
	12	12.28	8.15
June	11	11.70	2.93
	24	11.98	3.63
July	6	11.26	. . .
	13	11.28	9.97
	26	. . .	8.30

β Ursæ Minoris, S. P.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	10	14 51 12.39	+74 46 9.47
Feb.	12	13.27	2.62
April	20	11.53	9.72
May	1	11.12	6.71
	11	11.31	10.67
	18	11.80	9.77
	20	11.51	7.96
June	4	11.59	6.09
Sept.	14	11.57	5.33

β Libræ.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	25	15 8 56.53	— 8 49 33.57
April	4	56.49	. . .
May	3	56.57	34.46
	11	56.48	32.99
June	2	56.48	35.15
	6	56.50	32.50
July	6	56.33	29.39
	13	56.37	31.07
	26	56.47	31.76
Sept.	5	56.44	33.97

α Coronæ Borealis.

		Æ. h. m. s.	Dec. ° ′ ″
April	24	15 28 20.26	+27 13 21.54
May	3	20.31	19.19

α Coronæ Borealis—Continued.

		Æ. h. m. s.	De ° ′
June	2	15 28 20.31	+27 13
	6	20.36	
	17	20.09	
	18	20.34	
	19	20.37	
July	6	20.19	
	9	20.18	
	10	20.24	
	19	20.33	
Sept.	5	20.38	

α Serpentis.

April	3	(15 36 53.27)	+ 6 54
	4	53.05	
	24	(52.50)	
May	11	52.80	
	27	52.90	
June	2	52.94	
	17	52.84	
	18	52.94	
	19	52.88	
	22	52.96	
July	9	52.90	
	10	52.90	
	13	52.77	
	19	52.93	
	26	52.94	
Aug.	3	53.05	
Sept.	5	52.94	

ζ Ursæ Minoris.

Feb.	11	15 49 31.53	+78 15
April	3	32.01	
	24	31.87	
May	11	30.69	
	27	31.44	
June	2	31.20	
	6	31.87	
	16	31.07	
	18	31.56	
	22	31.50	
July	10	31.02	
	19	31.74	
	26	31.64	
Aug.	3	31.12	
Sept.	5	31.06	

ζ Ursæ Minoris, S. P.

Jan.	5	15 49 31.28	+78 15
	12	31.46	

β^1 Scorpii.

		Æ. h. m. s.	Dec. ° ′ ″
pril	3 . .	15 56 43.37	—19 23 27.89
	13 . .	43.39	25.08
ne	2 . .	43.19	25.04
	22 . .	43.26	27.50
	24 . .	43.25	26.13
ly	10 . .	43.19	. . .
	11 . .	43.31	. . .
	13 . .	43.22	24.73
	14 . .	43.21	26.80
	19 . .	43.22	26.88
	26 . .	43.23	. . .
ug.	3 . .	43.38	27.51

δ Ophiuchi.

pril	3 . .	16 6 (28.96)	+ 3 18 16.95
	24 . .	29.54	. . .
ay	11 . .	29.29	. . .
	13 . .	29.30	10.59
	27 . .	29.31	11.55
ne	2 . .	29.41	14.36
	6 . .	29.26	13.82
	16 . .	29.36	. . .
	18 . .	29.24	16.56
ly	6 . .	29.14	13.97
	10 . .	29.31	13.86
	13 . .	29.29	14.19
	19 . .	29.33	13.37
	26 . .	29.40	14.47
g.	3 . .	29.28	14.50
t.	5 . .	29.20	12.22

α Scorpii.

ril	3 . .	16 20 13.07	—26 5 42.46
	4 . .	13.06	. . .
	15 . .	13.22	39.21
y	11 . .	13.16	. . .
	13 . .	13.04	36.53
	19 . .	13.18	37.46
e	6 . .	12.92	38.55
	16 . .	13.13	39.60
	18 . .	12.92	41.43
	22 . .	12.92	39.04
	24 . .	12.95	38.02
y	1 . .	12.80	41.35
	6 . .	12.99	37.93
	7 . .	12.88	37.68
	10 . .	13.00	40.34
	13 . .	13.05	36.13
	26 . .	(12.35)	. . .
g.	3 . .	12.94	41.56
	5 . .	13.00	37.65
t.	5 . .	13.06	39.63

η Draconis.

		Æ. h. m. s.	Dec. ° ′ ″
April	6 . .	16 21 58.13	+61 51 14.46
	24 . .	58.49	16.56
June	2 . .	58.17	13.72
July	16 . .	57.53	11.05

ε Ursæ Minoris.

Feb.	11 . .	17 1 30.77	+82 16 31.13
April	15 . .	29.24	. . .
May	19 . .	30.69	33.09
June	2 . .	30.32	30.82
	19 . .	31.31	29.07
	21 . .	31.46	(21.29)
July	6 . .	29.79	31.71
	13 . .	29.93	27.81
	15 . .	30.71	. . .
	16 . .	30.49	27.11
	20 . .	. . .	32.17
	29 . .	30.47	30.01
	31 . .	30.25	35.22
Aug.	1 . .	31.43	29.20
	3 . .	30.07	31.62
	12 . .	30.51	28.05

ε Ursæ Minoris, S. P.

Jan.	10 . .	17 1 31.71	+82 16 33.95
	19 . .	31.88	35.34
Feb.	5 . .	31.03	30.28
	12 . .	31.00	33.75

α Hercules.

April	3 . .	17 7 48.61	+14 33 51.96
	24 . .	48.48	52.99
June	19 . .	48.56	53.05
	24 . .	48.58	56.74
	26 . .	48.69	56.96
July	15 . .	48.47	. . .
	29 . .	48.48	54.53
Aug.	1 . .	48.58	55.08
	10 . .	48.54	. . .

β Draconis.

April	19 . .	17 27 3.10	+52 24 55.53
July	20 . .	. . .	49.14
Aug.	1 . .	2.83	50.70

α Ophiuchi.

April	6 . .	17 27 (58.56)	+12 40 24.21
	15 . .	(58.52)	. . .
	24 . .	58.14	23.12
May	13 . .	58.52	26.31

α Ophiuchi—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
June	19 . .	17 27 58.46	+12 40 23.45
	21 . .	58.34	19.77
	23 . .	58.27	22.68
	26 . .	58.32	27.10
July	6 . .	58.38	23.50
	15 . .	58.32	27.98
	16 . .	(58.05)	24.35
	29 . .	58.37	24.25
	31 . .	58.20	27.72
Aug.	3 . .	58.36	23.72
	6 . .	58.30	24.18
	10 . .	58.28	. . .
	12 . .	58.40	27.28
	29 . .	58.47	24.73

γ Ophiuchi.

June	26 . .	17 40 22.27	+ 2 46 7.66

γ^1 Draconis.

Feb.	23 . .	17 53 7.65	+51 30 29.75
April	6 . .	7.26	27.77
	15 . .	7.36	28.88
	19 . .	7.42	30.51
	24 . .	7.71	31.13
May	4 . .	7.75	29.16
	13 . .	7.36	30.87
June	19 . .	7.48	26.80
	21 . .	7.61	(21.93)
	22 . .	7.34	32.34
	23 . .	7.47	24.39
	26 . .	7.56	31.10
Aug.	5 . .	7.45	30.29
	10 . .	7.26	. . .
	18 . .	7.39	28.71
	29 . .	7.41	31.81

μ^1 Sagittarii.

April	6 . .	18 4 47.56	—21 5 34.88
	15 . .	47.34	34.67
	17 . .	47.59	39.43
	19 . .	47.42	33.15
	20 . .	47.49	35.63
	24 . .	47.45	. . .
May	4 . .	47.52	33.90
	13 . .	47.43	33.91
June	21 . .	47.51	38.23
	22 . .	47.45	30.91
	23 . .	47.32	. . .
	26 . .	47.38	. . .
July	6 . .	47.62	35.50
	16 . .	47.44	34.98
Aug.	3 . .	47.53	35.93

μ¹ Sagittarii—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Aug.	5	18 4 47.53	—21 5 34.64
	6	(47.89)	34.30
	7	47.58	37.62
	10	47.40	. . .
	18	47.71	37.58
	29	47.49	33.59
Sept.	19	47.37	33.85

λ Sagittarii.

Aug.	3	18 18 42.75	—25 29 50.51

δ Ursæ Minoris.

Feb.	11	18 20 43.25	+86 35 . . .
April	3	43.47	. . .
	20	42.84	. . .
	24	43.08	48.10
May	4	44.27	47.97
June	22	44.62	50.05
July	11	42.59	48.18
	16	42.62	48.15
Aug.	1	43.18	48.14
	6	43.36	46.57
	8	42.18	48.40
Sept.	19	41.79	. . .

δ Ursæ Minoris, S. P.

Jan.	5	18 20 42.36	+86 35 54.27
	7	43.60	54.51
	10	41.02	54.09
	23	40.22	50.87
Feb.	4	43.09	51.93
	11	42.34	50.59
	16	40.97	50.31
	23	42.18	50.86
March	3	43.64	51.42
	5	(40.72)	48.55

α Lyræ.

Jan.	4	18 31 51.38	+38 38 50.90
	12	51.50	48.97
	13	51.58	49.87
	18	51.71	48.19
	22	51.78	47.87
Feb.	3	51.58	50.93
	4	51.65	47.80
	11	51.67	51.79
	18	. . .	48.06
	23	51.82	52.13
April	3	51.78	49.82
	6	51.58	47.38
	20	51.45	. . .

α Lyræ—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
April	24	18 31 51.64	+38 38 48.58
May	4	51.72	49.66
	13	51.59	. . .
	21	51.53	51.54
	25	51.54	. . .
June	3	51.58	49.69
	17	51.63	49.95
	22	51.63	51.65
	26	51.52	. . .
July	7	51.60	50.16
	11	51.48	49.10
	16	51.59	49.55
	31	51.45	49.47
Aug.	3	51.57	49.32
	6	51.50	49.26
	7	51.67	47.77
	8	51.58	50.25
	10	51.75	. . .
	13	51.36	50.02
	31	51.52	50.49
Sept.	2	51.49	49.26
	13	51.54	49.26
	14	51.49	50.27
	16	51.66	49.49
	19	51.65	52.42
	23	51.57	50.06
Dec.	26	51.58	50.21

Herculis, 6387.

June	26	18 19 12.45	+20 24 . . .

β Lyræ.

April	19	18 44 32.65	+33 11 . . .
May	25	32.55	. . .
June	26	32.56	30.15
July	11	32.57	29.76
	16	32.61	29.82
	31	32.38	28.20
Aug.	3	32.49	29.89
	5	32.47	31.70
	10	32.52	. . .
Oct.	8	32.60	31.15

σ Sagittarii.

May	13	18 45 57.79	—26 28 38.56

ο Sagittarii.

May	13	18 55 41.66	—21 57 18.58

ζ Aquilæ.

		Æ. h. m. s.	Dec. ° ′ ″
May	20	18 58 31.05	+13 38 (35.26)
June	22	31.06	43.46
	23	30.80	. . .
	26	30.79	. . .
July	16	31.01	42.44
	31	(31.10)	. . .
Aug.	3	30.88	39.43
	5	30.90	41.62
	7	30.80	37.96
Sept.	2	30.88	42.75
	21	30.93	40.45
	23	30.85	41.92
Oct.	8	31.00	42.61
	9	31.02	42.49

η Lyræ.

June	22	19 8 38.44	+38 53 27.55
Aug.	14	39.20	. . .

δ Aquilæ.

May	20	19 17 56.03	+ 2 49 (16.73)
June	3	55.92	12.77
	22	56.11	13.02
	26	55.93	12.88
July	7	56.03	11.37
	10	56.03	10.33
	14	56.09	13.99
	26	55.96	13.69
Aug.	3	56.05	10.19
	5	56.10	10.86
	7	55.91	11.30
	10	(56.43)	. . .
	14	56.05	11.99
	28	56.21	9.00
Sept.	2	56.09	13.03
	5	56.00	12.91
	13	56.02	9.88
	23	56.03	13.19
Oct.	8	56.12	11.65

α Sagittæ.

Aug.	14	19 33 23.41	+17 40 21.41

γ Aquilæ.

May	20	19 39 7.79	+10 15 5.93
June	22	7.70	7.55
	23	7.76	. . .
	26	7.55	6.38
July	16	7.68	4.67
	26	7.62	6.29
Aug.	6	7.60	4.51

γ Aquilæ—Continued.

Day	Æ. h. m. s.	Dec. ° ′ ″
8	19 39 7.48	+10 15 6.26
10	7.51	. . .
14	7.56	6.95
28	7.56	6.95
31	7.60	6.22
2	7.68	7.36
5	7.61	6.39
24	7.65	6.95
5	7.73	3.81
9	(7.98)	4.98

α Aquilæ.

Day	Æ. h. m. s.	Dec. ° ′ ″
19	19 43 27.77	+ 8 28 . . .
20	27.87	. . .
3	27.77	. . .
23	28.07	. . .
26	27.65	. . .
24	27.86	35.32
5	27.83	34.10
6	27.87	34.47
7	27.61	31.33
8	27.73	36.26
10	27.65	. . .
28	27.95	31.81
31	27.88	34.37
2	27.80	36.22
8	27.80	34.53
24	27.85	35.23
8	27.65	. . .
9	27.93	33.73
26	27.87	34.82

β Aquilæ.

Day	Æ. h. m. s.	Dec. ° ′ ″
20	19 47 56.88	+ 6 2 10.79
3	56.69	8.87
22	56.70	11.53
23	56.79	11.83
26	56.67	10.87
24	56.66	11.27
26	56.68	10.56
31	56.45	7.45
3	56.71	. . .
5	56.85	11.00
6	56.63	9.29
7	56.57	6.89
8	56.77	10.73
14	56.60	10.58
28	56.89	6.64
31	56.60	10.75
2	56.61	12.65
5	56.66	12.37
8	56.64	10.54

β Aquilæ—Continued.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
Sept.	25	19 47 56.77	+ 6 2 11.16
	29	56.48	11.16
Oct.	5	56.65	7.79
	7	56.83	10.06
	8	56.64	11.63
	9	56.69	9.62
	11	56.64	10.51
	19	56.83	(4.30)

α¹ Capricorni.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
Aug.	10	20 9 19.62	12 58 . . .

α² Capricorni.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
June	23	20 9 43.58	—13 0 . . .
July	16	43.73	20.57
	26	43.58	20.53
	31	43.61	23.04
Aug.	3	43.66	23.04
	4	43.64	18.51
	5	43.61	20.70
	7	43.76	22.95
	8	43.69	22.79
	10	43.62	. . .
	11	43.56	22.67
Sept.	1	43.71	20.16
	5	43.50	18.88
	8	43.54	21.28
	24	43.61	20.30
	25	43.70	19.73
Oct.	5	43.69	22.21
	8	43.55	16.85
	9	43.61	21.59
	14	43.55	19.82
	16	43.74	20.38

λ Ursæ Minoris.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
June	24	20 13 0.31	+88 51 40.41
Aug.	28	13 2.53	37.45
	31	12 59.61	37.08

λ Ursæ Minoris, S. P.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
March	9	. . . .	88 51 40.41

Cygni, 7067.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
Aug.	14	20 23 16.10	+29 52 15.77

α Cygni.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
Feb.	20	20 36 19.19	+44 44 50.80
June	24	19.15	46.70

α Cygni—Continued.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
July	24	20 36 19.08	+44 44 48.56
	26	(18.73)	. . .
Aug.	4	19.56	46.69
	6	18.99	46.36
	8	19.01	47.04
	11	19.05	46.45
	14	19.05	46.81
	31	19.14	47.72
Sept.	2	18.97	48.19
	9	19.20	46.47

61¹ Cygni.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
July	26	21 0 10.81	+38 0 52.56
	29	10.59	53.66
	31	10.55	. . .
Aug.	4	10.85	54.94
	5	10.45	53.46
	7	10.50	52.86
	8	10.49	51.80
	14	(9.97)	53.73
	31	10.69	52.30
Sept.	1	10.60	53.65
	2	10.54	53.15
	8	10.87	49.84
	9	10.76	51.99
	16	10.86	52.34
	25	10.70	53.71
	29	10.25	52.32
Oct.	5	10.70	52.77
	11	10.70	53.62
	14	10.70	51.75
	24	(10.99)	50.73

61² Cygni.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
July	29	21 0 11.94	+38 0 50.67
Aug.	4	12.00	51.04
	31	12.25	49.28
Sept.	2	11.89	. . .
	9	12.25	47.91
	16	12.27	50.35
	29	. . .	49.96

ζ Cygni.

Month	Day	Æ. h. m. s.	Dec. ° ′ ″
July	31	21 6 33.12	+29 36 50.06
Aug.	4	33.27	51.30
	7	(32.91)	49.77
Sept.	1	33.14	51.21
	5	33.18	50.58
	8	33.39	51.87
	25	33.28	52.79
Oct.	5	33.18	54.57
	14	33.31	48.91

ζ Cygni—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Oct.	21	21 6 33.41	+29 36 . . .
	24	33.40	51.40
	25	33.44	. . .

α Cephei.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	20	21 14 59.71	+61 57 5.35
July	29	59.73	5.18
	31	59.58	5.77
Aug.	4	. . .	5.88
	7	59.41	3.78
	31	59.51	3.40
Sept.	9	59.78	3.32
	25	59.47	4.05
Oct.	3	59.44	4.41
	5	59.71	3.01
	11	59.69	5.49
	14	59.43	2.31
	24	59.42	4.13

α Cephei, S. P.

		Æ. h. m. s.	Dec. ° ′ ″
Jan.	13	21 14 58.48	+61 57 3.38

β Aquarii.

		Æ. h. m. s.	Dec. ° ′ ″
July	10	21 23 39.45	— 6 13 41.49
	26	39.50	44.75
	31	39.59	41.42
Aug.	5	39.52	39.55
	31	39.44	39.89
Sept.	1	39.49	. . .
	5	39.40	. . .
	8	39.45	. . .
	9	39.38	39.88
	25	39.47	39.70
Oct.	3	39.41	. . .
	11	39.53	. . .
	14	39.62	. . .
	24	39.60	. . .
	25	39.48	. . .

β Cephei.

		Æ. h. m. s.	Dec. ° ′ ″
Feb.	20	21 29 42.24	+69 54 9.43
Aug.	4	42.16	10.04
	7	41.93	9.44
	28	. . .	(6.80)
Sept.	1	42.12	10.13
	2	41.85	10.46
	5	42.28	10.43
	8	42.74	11.33
	16	42.40	9.45
	29	42.25	10.71
Oct.	5	42.17	11.03

β Cephei—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Oct.	9	21 29 41.89	+63 54 12.59
	11	41.81	11.33
	14	42.06	9.22
	24	42.55	7.98
	25	42.35	11.08

ε Pegasi.

		Æ. h. m. s.	Dec. ° ′ ″
July	29	21 36 49.15	+ 9 11 24.67
	31	49.14	23.36
Aug.	4	48.93	23.12
	5	48.90	23.82
	28	49.06	20.49
	31	49.09	24.45
Sept.	1	49.18	24.11
	7	49.22	21.68
	8	49.11	23.11
	9	49.04	23.87
	16	49.04	22.95
	25	49.14	21.76
Oct.	3	49.02	22.04
	5	49.14	23.26
	9	49.01	24.36
	11	49.12	25.07
	23	49.15	23.56
	24	49.15	21.18
	25	49.04	23.84
Nov.	21	49.08	22.61

Pegasi, 7627.

		Æ. h. m. s.	Dec. ° ′ ″
Sept.	29	21 46 15.16	+25 13 17.96

Aquarii, 7648.

		Æ. h. m. s.	Dec. ° ′ ″
Oct.	25	21 50 18.57	—13 23 . . .
	29	19.01	48.44
Nov.	10	19.00	46.21
	30	19.03	50.37
Dec.	2	18.87	49.65

Bessel's Zone, 119.

		Æ. h. m. s.	Dec. ° ′ ″
Oct.	24	21 52 59.90	—13 44 21.89
	25	59.63	. . .

α Aquarii.

		Æ. h. m. s.	Dec. ° ′ ″
July	29	21 58 4.60	— 1 2 45.21
	31	4.58	47.47
Aug.	4	4.43	47.71
	5	4.54	47.00
	12	4.66	. . .
Oct.	3	4.33	46.00
	9	4.63	47.25

α Aquarii—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Oct.	14	21 58 (4.93)	— 1 2 49.16
	23	4.68	46.05

Pegasi, 7693.

		Æ. h. m. s.	Dec. ° ′ ″
Sept.	29	21 58 47.04	+28 14 15.18

Lacertæ, 7765.

		Æ. h. m. s.	Dec. ° ′ ″
Sept.	29	22 7 26.76	+38 58 20.36
Oct.	29	26.76	17.88
Nov.	30	26.56	20.80
Dec.	2	26.63	19.07

Pegasi, 7798.

		Æ. h. m. s.	Dec. ° ′ ″
Sept.	29	22 14 23.91	+27 34 37.08

ξ Pegasi.

		Æ. h. m. s.	Dec. ° ′ ″
July	31	22 33 58.85	+10 2 58.09
Aug.	7	58.79	59.43
	12	58.67	. . .
	28	58.89	57.49
	31	58.86	60.49
Sept.	7	58.88	59.88
	21	58.92	62.20
Oct.	21	58.90	62.66
	23	58.95	60.96
	24	58.81	60.31
Nov.	10	58.91	60.19
	16	58.82	61.35
	21	58.92	56.41
Dec.	2	58.80	60.79

α Piscis Aust.

		Æ. h. m. s.	Dec. ° ′ ″
July	29	22 49 20.81	—30 24 56.08
	31	21.00	61.77
Aug.	7	21.00	59.17
	12	21.07	56.33
	13	20.95	55.63
	18	20.88	. . .
	28	20.90	59.81
Sept.	1	20.92	. . .
	5	20.71	54.71
	7	20.85	59.66
	8	20.81	59.98
	25	20.78	57.33
	29	20.81	58.03
Oct.	5	20.74	59.93
	9	20.86	56.74
	23	20.80	57.67
	24	(20.60)	59.12
	29	(21.24)	60.20

α PISCIS AUST.—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
	16 . .	22 49 21.02	—30 24 57.40
	21 . .	20.96	57.44
	2 . .	21.04	59.51
	9 . .	20.87	57.77

α PEGASI.

		Æ.	Dec.
	31 . .	22 57 17.39	+14 23 56.70
	13 . .	17.55	59.76
	18 . .	17.39	53.71
	28 . .	17.46	56.83
	1 . .	17.56	57.82
	7 . .	17.48	59.29
	25 . .	17.54	60.34
	29 . .	17.61	58.50
	3 . .	17.43	59.71
	9 . .	17.52	60.15
	21 . .	17.46	62.44
	23 . .	17.55	61.17
	24 . .	17.67	58.61
	28 . .	17.39	60.69
	29 . .	17.56	56.07
	10 . .	17.53	56.63
	16 . .	17.57	58.00
	21 . .	17.60	58.43

α PEGASI—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Dec.	2 . .	22 57 17.45	+14 23 59.24
	9 . .	17.43	57.87

γ PISCIUM.

		Æ.	Dec.
Sept.	2 . .	23 9 23.19	+ 2 57 57.77

ι PISCIUM.

		Æ.	Dec.
Aug.	13 . .	23 32 14.30	+ 4 48 49.44
	31 . .	14.15	50.62

γ CEPHEI.

		Æ.	Dec.
Feb.	3 . .	23 33 14.58	+76 47 44.41
	4 . .	13.99	43.53
	10 . .	14.02	42.79
	20 . .	13.73	. . .
April	9 . .	13.09	40.83
July	24 . .	13.77	42.53
	29 . .	13.65	41.78
Aug.	11 . .	13.70	41.75
	28 . .	13.50	44.25
Sept.	1 . .	13.40	44.21
	7 . .	13.85	41.30

γ CEPHEI—Continued.

		Æ. h. m. s.	Dec. ° ′ ″
Sept.	8 . .	23 33 14.79	+76 47 44.97
	9 . .	13.94	43.12
	25 . .	13.78	42.76
	29 . .	13.97	41.25
Oct.	5 . .	13.39	43 62
	9 . .	13.12	44.45
	21 . .	14.55	45.34
	23 . .	13.94	44.29
	29 . .	13.44	44.87
Nov.	16 . .	13.48	42.26
	17 . .	13.70	(38.52)
Dec.	4 . .	14.23	42.97
	9 . .	13.11	43.89

γ CEPHEI, S. P.

		Æ.	Dec.
Jan.	23 . .	23 33 12.98	+76 47 39.61
Feb.	11 . .	15.07	43.62
	23 . .	13.05	45.71
March	30 . .	15.09	43.30
April	9 . .	13.87	. . .
	21 . .	13.98	42.86
	27 . .	13.11	43.52
May	3 . .	14.35	43.85
	13 . .	14.05	41.38

MEAN PLACES OF STARS

OBSERVED WITH

THE PRIME VERTICAL TRANSIT,

1846.

NATIONAL OBSERVATORY.

AURIGÆ, 2241.

		h. m. s.	° ′ ″
Feb.	13	6 43 39.22	38 40 59.14
March	8	39.52	59.74

1241 GROOMBRIDGE.

Feb.	21	6 45 17.92	38 5 57.88
	22	17.87	57.43
	26	17.18	58.10

ANONYMOUS.

Feb.	16	7 7 46.94	38 37 33.55
March	3	47.53	33.95
	5	47.48	33.30
	8	47.62	33.97
	10	48.07	33.62

AURIGÆ 2416.

Jan.	13	7 12 0.71	37 2 13.94
Nov.	20	0.93	14.40

α^2 GEMINORUM.

Jan.	13	7 25 1.35	32 12 42.82
March	3	1.00	43.85
May	11	0.28	43.51
	12	0.38	44.03

1343 GROOMBRIDGE.

March	5	7 27 59.71	38 35 22.67
	8	60.06	23.27
	10	60.14	22.91

1352 GROOMBRIDGE.

March	3	7 30 7.37	38 40 55.94

β GEMINORUM.

May	21	7 36 7.93	28 23 2.71

BESSEL Z. 493.

April	6	8 53 55.24	38 26 7.35

LYNCIS, 3162.

March	17	9 9 29.29	37 26 2.68
April	14	29.95	3.56
	15	29.96	3.35

LEONIS MINORIS, 3252.

April	16	9 24 17.27	37 8 56.75

LEONIS MINORIS, 3261.

		h. m. s.	° ′ ″
April	15	9 25 1.62	37 3 38.68

BESSEL Z. 407.

March	17	9 40 22.61	37 26 33.13
April	4	23.16	33.52
	6	22.98	33.54

LEONIS MINORIS, 3364.

March	31	9 43 14.06	38 36 56.24
April	14	14.51	56.20

BESSEL Z. 407.

April	4	9 45 47.82	38 7 13.70
	14	47.25	13.35

BESSEL Z. 407.

April	4	9 54 53.28	38 44 53.25
	16	52.72	53.88

LEONIS MINORIS, 3446.

March	17	9 58 33.58	35 58 25.04
April	15	34.44	24.97

BESSEL Z. 407.

April	15	10 2 18.74	38 8 19.47
	16	18.34	19.68

BESSEL Z. 407.

April	6	10 3 9.37	36 59 16.30
	15	9.79	16.72

BESSEL Z. 407.

March	30	10 9 31.15	38 15 23.50
April	19	31.94	23.34

β LEONIS MINORIS.

March	17	10 19 11.10	37 28 27.25
	21	11.29	27.45
	30	10.88	27.70

ANONYMOUS.

April	4	10 21 53.98	37 48 6.11

BESSEL Z. 411.

April	16	10 39 51.31	38 21 37.21
	19	51.87	37.05
	20	51.59	37.07

BESSEL Z. 411.

		h. m. s.	° ′
April	15	10 46 19.75	37 33

BESSEL Z. 499.

April	19	10 55 8.33	36 58

BESSEL Z. 411.

March	21	11 1 2.97	37 7
	31	2.67	

BESSEL Z. 358.

March	17	11 4 21.62	36 36
	21	21.69	
	31	21.39	

BESSEL Z. 358.

March	21	11 4 31.33	36 38
	31	30.93	

BESSEL Z. 411.

April	16	11 6 48.76	38 23
	21	48.48	

ANONYMOUS.

April	27	11 13 29.76	38 20

BESSEL Z. 411.

April	27	11 13 57.01	37 54

BESSEL Z. 411.

April	19	11 15 46.57	38 3
May	4	46.03	

BESSEL Z. 411.

April	2	11 22 11.07	38 46
	9	11.45	

ANONYMOUS.

May	11	11 36 58.86	38 45

BESSEL Z. 411.

April	19	11 37 43.46	36 43

BESSEL Z. 411.

March	31	11 47 27.59	37 35
April	9	29.01	

Bessel Z. 411.

		h. m. s.	° ′ ″
il	2 . .	11 52 26.39	37 33 54.01
y	11 . .	26.75	54.33

Bessel Z. 411.

y	11 . .	11 52 34.09	37 34 8.59

Bessel Z. 411.

rch	31 . .	11 53 57.87	36 52 50.90

Anonymous.

il	27 . .	11 59 42.82	37 51 0.54

Bessel Z. 463.

	13 . .	12 12 41.32	38 44 8.35

Bessel Z. 463.

	4 . .	12 27 50.73	37 15 10.75

Canum Venaticorum, 431ſ.

l	2 . .	12 43 2.04	38 20 3.14
	9 . .	3.25	3.28
	19 . .	2.80	3.38
	4 . .	1.87	2.52
	19 . .	3.66	2.62

Bessel Z. 463.

	19 . .	12 50 46.65	37 32 27.97
	27 . .	45.38	27.62

Canum Venaticorum, 4384.

l	2 . .	12 58 43.14	36 36 10.63
	19 . .	42.97	10.89

Bessel Z. 463.

	2 . .	13 2 43.52	38 13 24.51

Bessel Z. 463.

l	2 . .	13 14 21.52	38 38 41.48
	9 . .	23.02	41.25
	19 . .	21.83	41.74
	27 . .	19.68	41.09

Bessel Z. 463.

	2 . .	13 22 19.49	37 5 19.59

Bessel Z. 463.

		h. m. s.	° ′ ″
April	2 . .	13 25 38.17	37 35 32.12
	9 . .	39.19	33.69

Canum Venaticorum, 4536.

May	2 . .	13 28 5.68	37 57 9.52

Anonymous.

May	19 . .	13 37 56.05	37 21 1.26

Bessel Z. 463.

May	4 . .	13 43 12.40	37 22 43.15
	11 . .	13.03	42.96

Bessel Z. 463.

May	19 . .	13 44 58.23	38 27 46.30

Anonymous.

May	4 . .	13 48 8.34	37 52 25.13

Bessel Z. 415.

May	11 . .	14 1 49.61	37 27 49.29

α Bootis.

Jan.	13 . .	14 8 49.42	19 57 56.93
March	21 . .	49.36	55.34
	31 . .	48.84	53.73
May	21 . .	49.21	56.79
Aug.	12 . .	49.15	56.12
Sept.	16 . .	48.63	57.37
	24 . .	49.50	56.28
	28 . .	49.74	57.75
	29 . .	49.48	58.47
Oct.	1 . .	48.88	58.62

Anonymous.

April	27 . .	14 17 15.42	37 53 16.00

Anonymous.

June	3 . .	14 22 0.14	38 13 46.68

Bootis, 4825.

May	11 . .	14 28 30.56	37 17 14.41

Bessel Z. 415.

May	11 . .	14 29 6.96	37 47 55.64

Anonymous.

		h. m. s.	° ′ ″
May	25 . .	14 34 58.90	38 47 17.29

Bessel Z. 415.

May	2 . .	14 36 35.79	37 23 53.39

Anonymous.

April	27 . .	14 39 59.93	37 31 36.68

Bessel Z. 415.

May	4 . .	14 43 12.84	38 25 54.08
	19 . .	13.39	53.79

Bessel Z. 416.

May	25 . .	14 43 17.98	36 41 48.87

Bootis, 4906.

May	19 . .	14 44 34.51	37 53 23.90

Bessel Z. 415.

May	2 . .	15 0 42.76	37 2 8.25
	25 . .	42.56	8.18

Bessel Z. 415.

May	11 . .	15 10 38.54	37 37 25.12

Anonymous.

June	3 . .	15 18 39.67	38 43 29.73

μ Bootis.

June	3 . .	15 18 47.82	37 54 20.68

α Coronæ Bor.

March	31 . .	15 28 20.22	27 13 22.59
May	11 . .	20.87	20.44
Sept.	23 . .	19.86	22.26

ζ Coronæ Bor.

June	3 . .	15 33 42.99	37 7 32.07
	15 . .	43.54	32.10

Bessel Z. 415.

April	27 . .	15 34 50.80	38 0 14.13

Anonymous.

June	15 . .	15 45 20.93	38 0 25.12

κ Coronæ Bor.

		h. m. s.	° ′ ″
June	3 . .	15 45 34.09	36 7 33.94
	15 . .	34.69	33.32

Bessel Z. 421.

June	15 . .	15 50 26.19	37 9 43.25

Bessel Z. 421.

May	11 . .	15 52 50.77	37 38 41.72

Bessel Z. 421.

June	3 . .	15 53 28.73	37 22 19.50

Anonymous.

May	25 . .	16 12 32.86	38 4 2.60
June	24 . .	32.64	1.97

Bessel Z. 421.

May	9 . .	16 13 40.46	38 7 57.84

Bessel Z. 421.

June	15 . .	16 14 54.04	37 20 15.51

Bessel Z. 421.

May	2 . .	16 18 49.41	37 23 3.32
June	24 . .	49.18	3.16

Herculis, 5496.

May	21 . .	16 20 3.46	37 44 18.99
July	9 . .	4.91	19.26

Bessel Z. 421.

July	10 . .	16 33 56.83	38 38 33.86

Anonymous.

July	15 . .	16 34 32.35	38 29 43.41

Bessel Z. 421.

May	25 . .	16 42 23.65	37 49 44.03
June	24 . .	23.45	44.19

Herculis, 5788.

June	15 . .	17 2 42.58	36 7 59.94
	21 . .	42.72	60.09
July	10 . .	42.54	59.62

Bessel Z. 421.

		h. m. s.	° ′ ″
July	10 . .	17 4 28.86	38 29 0.25

π Herculis.

June	15 . .	17 9 49.11	36 58 52.47
	21 . .	49.04	53.81

Herculis, 5847.

May	11 . .	17 12 30.45	37 27 5.41
	25 . .	30.22	6.16
June	15 . .	29.74	5.48

ρ Herculis.

June	3 . .	17 18 29.92	37 17 12.68

Bessel Z. 421.

July	14 . .	17 18 57.72	38 43 15.21

Bessel Z. 421.

June	24 . .	17 19 15.52	37 5 18.70

Bessel Z. 480.

July	14 . .	17 27 8.02	35 52 58.81

Bessel Z. 480.

July	14 . .	17 42 23.91	36 10 58.77

Anonymous.

June	24 . .	17 45 49.38	37 45 1.95

Bessel Z. 480.

June	24 . .	18 4 45.93	36 26 20.61

κ Lyræ.

June	15 . .	18 14 35.95	36 0 0.37
Aug.	11 . .	36.34	0.87

Anonymous.

June	21 . .	18 16 12.84	36 52 43.46

α Lyræ.

Jan.	4 . .	18 31 51.04	38 38 49.73
	12 . .	51.06	50.16
	13 . .	51.70	49.76
	14 . .	51.47	49.85
	18 . .	51.34	50.64

α Lyræ—Continued.

		h. m. s.	° ′
Jan.	21 . .	18 31 51.00	38 38
	22 . .	51.11	
	23 . .	51.48	
	24 . .	50.77	
	27 . .	49.81	
Feb.	4 . .	51.31	
	9 . .	51.58	
	12 . .	51.03	
March	4 . .	52.06	
	8 . .	51.24	
	17 . .	51.43	
	21 . .	50.82	
	30 . .	52.33	
	31 . .	50.95	
April	2 . .	51.22	
	4 . .	52.03	
	19 . .	52.35	
May	2 . .	51.38	
	11 . .	50.93	
	13 . .	51.22	
	21 . .	50.81	
	25 . .	51.52	
June	15 . .	. . .	
	21 . .	50.73	
	24 . .	51.60	
Sept.	24 . .	50.95	
	28 . .	50.83	
Dec.	15 . .	51.92	
	18 . .	. . .	

ζ¹ Lyræ.

May	25 . .	18 37 36.49	37 26
June	21 . .	36.03	

β Lyræ.

June	21 . .	18 44 32.32	33 11
Aug.	11 . .	32.63	

δ² Lyræ.

May	25 . .	18 49 15.93	36 42
June	3 . .	14.92	
	21 . .	15.12	

η Lyræ.

Sept.	13 . .	. . .	38 53
	14 . .	. . .	

ϑ Lyræ.

Aug.	8 . .	19 11 9.44	37 52

Anonymous.

			h. m. s.	° ′ ″
	11	. .	19 13 44.52	37 10 17.13

Cygni, 6722.

	13	. .	19 30 23.75	36 36 52.76

Cygni, 6771.

	8	. .	19 38 51.66	36 59 41.48
	16	. .	50.80	41.68
	21	. .	51.44	42.89

Cygni, 6813.

	11	. .	19 45 14.97	38 20 21.66

Cygni, 6849.

	8	. .	19 50 29.94	38 5 27.14
	16	. .	28.74	27.28
	7	. .	30.01	27.02

Anonymous.

	31	. .	20 0 47.21	35 33 44.34

Anonymous.

	13	. .	20 1 56.86	33 2 41.58

Cygni, 6937.

	11	. .	20 3 51.34	36 24 2.98
	13	. .	51.03	2 61
	20	. .	51.63	4.39
	21	. .	50.90	3.59

Bessel Z. 314.

	29	. .	20 6 11.41	38 26 2.34

Bessel Z. 314.

	13	. .	20 7 54.58	38 18 52.99

Bessel Z. 314.

	13	. .	20 8 29.30	38 42 20.07

Cygni, 6967.

	1	. .	20 8 54.58	36 20 58.76

Bessel Z. 487.

	21	. .	20 10 36.26	38 26 25.55
	22	. .	36.18	26.30

Bessel Z. 486.

			h. m. s.	° ′ ″
Aug.	31	. .	20 10 52.28	36 35 47.15

Cygni, 6990.

Aug.	13	. .	20 12 15.30	37 34 8.69

Anonymous.

Sept.	28	. .	20 13 29.23	38 32 13.28
Oct.	5	. .	29.74	13.05

Bessel Z. 314.

Sept.	21	. .	20 17 28.54	38 43 53.45
	23	. .	27.79	54.32
Oct.	1	. .	27.65	54.24
	6	. .	27.76	53.62

Anonymous.

Sept.	20	. .	20 22 0.93	37 57 1.63

Anonymous.

Aug.	29	. .	20 22 54.74	38 49 55.13

Anonymous.

Aug.	11	. .	20 31 45.37	37 48 32.97
Sept.	16	. .	44.29	35.52

Bessel Z. 314.

Sept.	20	. .	20 33 0.34	38 7 6.18

Bessel Z. 312.

Aug.	31	. .	20 41 11.81	33 49 30.89

λ Cygni.

Sept.	21	. .	20 41 33.63	35 56 31.75
	22	. .	33.76	30.57

Bessel Z. 314.

Oct.	7	. .	20 42 19.84	38 44 12.59

Anonymous.

Oct.	6	. .	20 47 38.07	38 46 31.77

Bessel Z. 313.

Sept.	29	. .	20 48 50.47	36 30 18.36

Bessel Z. 313.

			h. m. s.	° ′ ″
Sept.	23	. .	20 55 14.25	35 26 26.07
	29	. .	14.62	25.32

Cygni, 7320.

Sept.	28	. .	20 57 15.33	38 4 0.21

61¹ Cygni.

June	21	. .	21 0 10.22	38 0 52.71
Sept.	9	. .	10.91	52.95
	14	. .	10.39	52.66
Oct.	1	. .	9.27	53.81
	5	. .	10.28	52.44

61² Cygni.

Sept.	9	. .	21 0 12.56	38 0 49.11
	14	. .	11.96	48.76
Oct.	1	. .	10.82	50.14
	5	. .	11.84	48.85

Anonymous.

Sept.	22	. .	21 5 1.92	35 41 18.97
	23	. .	1.46	20.26
Oct.	6	. .	1.75	20.31

ζ Cygni.

Sept.	20	. .	21 6 33.23	29 36 53.46
	21	. .	33.01	52.45

Anonymous.

Sept.	21	. .	21 6 35.33	37 57 7.84
Oct.	6	. .	34.77	7.55

Bessel Z. 313.

Oct.	6	. .	21 6 49.07	35 11 1.07
	7	. .	49.41	0.57

Bessel Z. 313.

Oct.	5	. .	21 7 24.87	36 1 0.00
	6	. .	24.34	0.17

Anonymous.

Sept.	29	. .	21 8 30.43	38 37 21.51
Oct.	5	. .	30.78	21.13
	26	. .	30.42	21.40

τ Cygni.

Sept.	9	. .	21 8 48.55	37 24 24.81
	20	. .	48.24	26.00

σ CYGNI.

		h. m. s.	° ′ ″
Sept.	23	21 11 31.1	38 46 6.27
Oct.	11	31.8	5.87
Nov.	3	30.2	5.52

BESSEL Z. 314.

Sept.	20	21 13 23.54	38 10 32.14
	29	22.78	31.82

ANONYMOUS.

Oct.	7	21 13 23.23	37 36 23.11

BESSEL Z. 314.

Sept.	20	21 13 40.85	38 10 13.70
	29	40.15	13.32

ANONYMOUS.

Sept.	21	21 17 25.56	38 3 10.59

BESSEL Z. 313.

Sept.	16	21 17 43.28	36 42 37.71
	22	43.99	36.34

BESSEL Z. 313.

Sept.	14	21 19 39.72	36 1 18.15

CYGNI, 7462.

Sept.	14	21 21 14.63	36 28 1.89
	29	14.27	1.33

CYGNI, 7505.

Sept.	9	21 28 39.61	37 51 48.89
	14	39.00	49.42

BESSEL Z. 314.

Sept.	23	21 28 53.9	38 46 9.30

BESSEL Z. 314.

Sept.	16	21 38 46.49	38 50 14.18
	21	47.17	15.20

BESSEL Z. 312.

Oct.	7	21 34 42.35	33 59 44.28

CYGNI, 7566.

Sept.	28	21 37 13.07	37 35 56.64
Oct.	7	13.63	56.83

ANONYMOUS.

		h. m. s.	° ′ ″
Oct.	6	21 39 22.85	35 10 3.60

BESSEL Z. 213.

Oct.	5	21 41 49.21	35 53 11.58

ANONYMOUS.

Oct.	17	21 42 15.57	37 57 12.33

BESSEL Z. 314.

Oct.	7	21 44 52.26	38 50 10.88
	16	51.86	10.28

ANONYMOUS.

Sept.	20	21 45 46.73	38 15 5.10
Oct.	16	46.68	5.17
	21	47.61	4.28

ANONYMOUS.

Oct.	21	21 46 1.19	38 13 7.74

BESSEL Z. 314.

Oct.	26	21 46 33.47	38 7 56.11

BESSEL Z. 313.

Oct.	7	21 48 56.97	35 26 19.37

BESSEL Z. 312.

Oct.	7	21 53 45.85	33 54 43.15

BESSEL Z. 313.

Sept.	28	21 55 49.77	36 15 42.37
Oct.	5	49.91	42.83

α LACERTÆ.

Aug.	11	22 9 26.42	37 0 13.18
Sept.	20	25.77	12.81
	29	26.14	12.78

BESSEL Z. 380.

Sept.	9	22 11 19.60	38 16 37.06

ANONYMOUS.

Oct.	15	22 20 6.88	36 40 55.81
	19	6.41	55.06

LACERTÆ, 7880.

		h. m. s.	° ′
Sept.	23	22 29 11.2	38 51
Oct.	5	10.97	
	6	11.25	

ANONYMOUS.

Oct.	15	22 29 19.36	34 48 1

ANONYMOUS.

Oct.	21	22 29 21.71	35 59 1

BESSEL Z. 379.

Sept.	9	22 29 38.75	37 3 5
	14	38.38	6
Oct.	21	38.84	5

BESSEL Z. 379.

Oct.	19	22 32 17.99	36 35

LACERTÆ, 7901.

Sept.	9	22 32 32.79	38 16
	14	32.44	
Oct.	6	32.19	1
	7	31.69	
	15	32.34	
	16	31.80	

BESSEL Z. 379.

Oct.	15	22 32 44.81	36 34
	19	44.85	

ANONYMOUS.

Oct.	5	22 32 47.66	36 48

BESSEL Z. 379.

Oct.	24	22 41 19.44	36 37 4
	26	19.19	4

BESSEL Z. 379.

Oct.	15	22 48 4.74	36 16 4
	19	4.61	4

BESSEL Z. 379.

Oct.	19	23 2 52.63	36 2 59

Bessel Z. 379.

		h.	m.	s.	°	′	″
	15 . .	23	2	56.18	36	2	9.29
	19 . .			55.99			9.81

Andromedæ, 8136.

		h.	m.	s.	°	′	″
	24 . .	23	13	39.61	37	21	51.68

Bessel Z. 379.

		h.	m.	s.	°	′	″
	21 . .	23	17	27.52	35	32	20.40
	24 . .			25.92			21.24

Bessel Z. 387.

		h.	m.	s.	°	′	″
	13 . .	23	21	21.58	38	47	39.61

Andromedæ, 8195.

		h.	m.	s.	°	′	″
Oct.	24 . .	23	23	55.24	38	24	46.29

Bessel Z. 384.

		h.	m.	s.	°	′	″
Oct.	24 . .	23	30	2.96	34	59	10.05

Bessel Z. 379.

		h.	m.	s.	°	′	″
Oct.	21 . .	23	33	12.15	35	53	19.82
	24 . .			11.74			19.60

Anonymous.

		h.	m.	s.	°	′	″
Oct.	21 . .	23	46	29.87	38	26	50.03
	26 . .			29.24			47.97

Bessel Z. 384.

		h.	m.	s.	°	′	″
Oct.	15 . .	23	50	2.72	34	59	11.75

Bessel Z. 387.

		h.	m.	s.	°	′	″
Oct.	19 . .	23	59	5.87	37	47	25.21

RIGHT ASCENSIONS

OF THE

SUN, MOON, AND PLANETS,

OBSERVED WITH

THE WEST TRANSIT INSTRUMENT,

1846.

NATIONAL OBSERVATORY.

SUN.

Date.		Observed.	Naut. Almanac.	O.—C.
		h. m. s.	s.	s.
January	2	18 52 14.03	14.13	— 0.10
	3	18 56 38.55	38.50	+ 0.05
	13	19 40 15.93	16.07	— 0.14
	14	44 34.51	34.61	— 0.04
	15	19 48 52.52	52.50	+ 0.02
	19	20 5 57.15	57.18	— 0.03
	20	10 11.53	11.55	0.02
	22	18 38.02	38.10	0.08
	23	22 50.22	50.24	0.02
	24	20 27 1.43	1.58	0.15
February	5	21 16 13.83	13.89	0.06
	20	22 15 1.40	1.42	— 0.02
	23	26 28.11	28.06	+ 0.05
March	3	22 56 33.68	33.55	— 0.13
	4	23 0 16.91	16.86	+ 0.05
	7	11 24.28	24.09	0.19
	9	18 47.09	46.82	0.27
	10	22 27.69	27.62	0.07
	11	26 8.15	8.09	0.06
	12	29 48.36	48.22	0.14
	17	48 5.38	5.02	0.36
	18	51 43.95	43.77	0.18
	19	23 55 22.41	22.35	+ 0.06
	21	0 2 39.08	39.16	— 0.08
	25	17 12.07	11.78	+ 0.29
	30	35 22.40	22.23	0.17
	31	39 0.50	0.44	0.06
April	1	42 38.89	38.74	0.15
	2	46 17.30	17.12	0.18
	3	49 55.79	55.59	0.20
	4	0 53 34.23	34.21	0.02
	6	1 0 52.13	51.91	+ 0.22
	9	11 49.73	49.93	— 0.20
	10	15 30.25	29.74	+ 0.51
	14	30 12.06	11.91	0.15
	15	33 53.35	50.30	+ 0.05
	16	37 35.01	35.05	— 0.04
	18	44 59.78	59.72	+ 0.06
	20	52 26.19	26.07	+ 0.12
	21	56 9.79	9.91	— 0.12
	22	1 59 54.21	54.20	+ 0.01
	23	2 3 38.79	38.96	— 0.17
	24	7 24.11	24.20	— 0.09
	27	18 42.92	42.81	+ 0.11
	30	30 5.99	5.90	+ 0.09
May	1	33 54.65	54.66	— 0.01
	2	37 43.92	43.90	+ 0.02
	4	45 24.15	24.00	0.15
	5	49 14.93	14.86	0.07
	6	2 53 6.36	6.25	0.11
	11	3 12 31.75	31.68	0.07
	12	16 26.61	26.49	0.12
	13	20 22.00	21.89	0.11
	14	24 17.95	17.87	+ 0.08
	18	40 7.70	7.70	0.00
	19	44 6.54	6.62	— 0.08
	20	48 6.15	6.11	+ 0.04
	21	3 52 6.09	6.16	— 0.07
	23	4 0 8.31	7.92	+ 0.39
	25	8 11.87	11.79	0.08
	26	12 14.67	14.47	+ 0.20
June	3	43 51.69	52.01	— 0.32
	5	4 53 4.23	5.22	— 0.99

SUN—Continued.

Date.		Observed.	Naut. Almanac.	O.—
		h. m. s.	s.	s
June	6	57 12.41	12.32	+ 0.
	8	5 5 26.86	27.40	— 0.
	15	34 27.57	27.77	0.
	17	42 46.47	46.58	— 0.
	19	51 5.89	5.78	+ 0
	20	5 55 15.72	15.45	+ 0.
	23	6 7 44.22	44.43	— 0
	25	6 16 3.54	3.48	+ 0
July	6	7 1 33.43	33.86	— 0
	7	5 40.10	40.27	— 0
	9	13 57.96	51.93	+ 0.
	10	7 17 57.31	57.16	+ 0.
	11	8 22 1.77	1.97	— 0.
	31	41 51.44	51.49	0
August	1	44 44.68	44.82	0
	3	53 29.47	29.62	— 0.
	4	8 57 21.17	21.10	+ 0
	5	9 1 11.91	11.96	— 0
	7	8 51.80	51.87	0.
	8	12 41.09	40.96	+ 0.
	11	24 4.49	4.73	— 0.
	14	35 23.76	23.57	+ 0.
	20	9 57 47.44	47.42	0.
	21	10 1 29.72	29.71	0.
	31	10 38 9.27	9.00	0.
September	1	10 41 47.08	46.86	+ 0.
	2	45 24.36	24.41	— 0.
	3	49 1.77	1.67	+ 0.
	4	52 38.45	38.66	— 0.
	5	10 56 15.54	15.40	+ 0.
	7	11 3 28.26	28.23	0.
	8	7 4.38	4.35	0.
	9	10 40.58	40.31	0.
	12	21 27.49	27.47	0.
	16	35 49.39	49.39	+ 0.
	17	39 24.72	24.82	— 0.
	19	46 36.06	35.74	+ 0.
	22	11 57 22.72	22.56	0.
	28	12 18 59.37	59.35	0.
	29	22 36.34	36.12	+ 0.
	30	26 13.01	13.10	— 0.
October	1	29 50.28	50.34	0.
	2	12 33 27.74	27.88	— 0.
	6	12 48 1.61	1.24	+ 0.
	8	55 20.35	20.22	0.
	9	12 59 0.45	0.37	0.
	10	13 2 41.09	40.98	0.
	14	17 28.56	20.50	+ 0.
	16	24 55.42	55.57	— 0.1
	17	28 40.01	39.99	+ 0.
	20	39 56.90	56.92	— 0.0
	23	51 19.86	19.69	+ 0.1
	24	13 55 8.64	8.62	+ 0.0
	29	14 14 23.88	23.92	— 0.0
November	10	15 1 56.40	56.48	0.0
	16	26 28.66	28.78	0.1
	17	15 30 37.14	37.18	0.0
	30	16 25 37.90	38.02	— 0.1
December	18	17 44 37.21	36.92	+ 0.2
	22	18 2 23.51	23.41	0.1
	23	18 6 50.17	50.10	+ 0.0

MOON.

Date.	Mean time of observation.	Observed.	Naut. Al.	O.—C.
	h. m. s.	h. m. s.	s.	s.
ı. 3	5 20 39.27	0 13 17.04	17.63	— 0.59
4	6 9 14.01	1 5 56.32	56.80	0.48
8	9 23 54.40	4 36 54.90	55.28	— 0.38
10	11 1 12.19	6 22 21.81	21.78	+ 0.03
13	13 19 3.30	8 52 25.22	25.56	— 0.34
14	14 2 30.16	9 39 55.77	56.14	0.37
). 4	7 20 44.50	4 19 51.79	52.35	0.56
5	8 9 45.67	5 12 57.54	57.76	— 0.22
20	20 8 55.06	8 13 13.41	13.39	+ 0.02
rch 7	8 29 9.36	7 29 40.88	41.51	— 0.63
9	9 57 56.51	9 7 35.88	36.14	0.26
10	10 41 32.23	9 55 15.31	15.32	0.01
31	3 54 38.58	4 30 2.42	3.12	0.70
ril 1	4 45 18.79	5 24 47.51	47.92	0.41
3	6 22 18.08	7 9 55.83	56.48	0.65
4	7 8 23.83	8 0 5.58	6.50	0.92
6	8 36 51.47	9 36 40.96	41.61	0.55
9	10 47 52.99	11 59 53.66	54.09	0.43
13	14 4 40.32	15 32 59.53	59.96	0.43
15	15 56 32.22	17 33 2.92	4.02	1.10
27	1 42 54.43	4 4 23.55	24.01	0.46
y 11	12 50 47.83	16 9 18.42	18.86	0.44
12	13 48 31.28	17 11 8.91	9.50	0.59
e 3	7 18 4.48	12 6 21.21	22.10	0.89
6	9 42 6.54	14 42 36.60	37.28	0.68
y 1	5 56 34.96	12 35 1.99	2.62	0.53
6	10 15 52.84	17 14 45.15	46.26	1.11
7	11 16 28.74	18 19 27.56	28.37	0.81
8	12 17 27.38	19 24 32.83	33.95	1.12
9	13 17 14.38	20 28 26.18	27.25	1.07
10	14 14 49.27	21 30 7.05	7.97	0.92
31	6 12 8.41	14 48 54.59	55.74	1.15
gust 3	8 57 44.67	17 46 47.72	49.05	1.33
4	9 57 47.87	18 50 57.33	58.53	1.20
5	10 58 12.09	19 55 28.04	29.19	1.15
6	11 57 38.47	20 59 0.73	2.00	1.27
31	7 41 59.80	18 21 13.90	15.27	1.37
t. 1	8 40 24.04	19 23 44.29	45.61	1.32
2	9 38 57.81	20 26 24.24	25.55	1.31
24	2 54 43.43	15 7 47.59	47.92	0.33
29	7 26 7.92	19 59 39.43	40.11	0.68
30	8 22 12.10	20 59 49.37	50.08	0.71
ober 1	9 17 41.35	21 59 24.29	25.40	1.11
5	12 56 21.83	1 54 26.90	27.80	0.90
28	7 8 58.67	21 36 46.39	46.74	0.35
30	10 17 59.61	2 56 25.69	26.02	— 0.33

MERCURY.

27	22 39 32.99	19 9 38.77	39.27	— 0.50
. 19	23 35 32.30	21 36 28.04	27.95	+ 0.09
22	23 42 56.16	21 55 42.78	42.98	— 0.20
25	23 52 30.95	22 17 8.80	8.83	— 0.03
. 6	0 16 19.87	23 12 34.05	33.57	+ 0.48
18	0 52 40.02	0 36 18.79	18.84	— 0.05
25	1 9 2.81	1 19 19.86	19.46	+ 0.40
il 1	1 10 15.38	1 49 8.77	8.47	+ 0.30
e 2	22 43 8.79	3 30 0.93	0.95	— 0.02

MERCURY—Continued.

Date.	Mean time of observation.	Observed.	Naut. Al.	O.—C.
	h. m. s.	h. m. s.	s.	s.
June 5	22 53 7.48	3 51 50.93	50.78	+ 0.15
July 9	1 29 19.29	8 38 34.78	34.84	— 0.06
10	1 32 6.95	8 45 19.45	19.95	0.50
31	1 49 10.47	10 25 13.46	13.61	— 0.15
Sept. 4	22 57 32.39	9 55 3.11	2.59	+ 0.52
6	22 52 58.32	9 58 21.40	21.22	0.18
11	22 50 36.78	10 15 42.23	41.98	+ 0.25
16	22 57 59.15	10 42 48.57	48.84	— 0.27
17	23 0 1.89	10 48 48.20	58.35	— 0.15
20	23 7 38.26	11 8 15.48	15.16	+ 0.32
21	23 10 16.34	11 14 50.54	50.86	— 0.32
23	23 15 40.29	11 28 8.49	9.01	0.52
24	23 18 23.61	11 34 48.80	49.29	— 0.49

VENUS.

Jan. 5	3 14 17.68	22 14 27.81	28.39	— 0.58
8	3 11 44.32	23 43.71	43.26	— 0.55
13	3 6 8.47	37 49.72	49.47	+ 0.25
14	3 4 48.94	40 26.53	26.03	+ 0.50
19	2 57 0.11	52 19.19	19.17	0.02
22	2 51 18.66	22 58 26.47	26.42	0.05
23	2 49 14.06	23 0 18.09	17.80	0.29
24	2 47 3.49	2 3.72	3.39	0.33
26	2 42 24.49	5 17.07	16.45	0.62
28	2 37 19.40	8 4.25	4.00	+ 0.25
Feb. 20	1 1 1.04	23 2 10.82	11.04	— 0.22
23	0 43 10.15	22 56 15.69	15.96	0.20
26	0 24 56.43	49 39.61	39.99	0.38
March 5	23 35 26.28	31 33.73	33.76	0.03
6	23 20 27.22	29 30.25	30.79	0.54
13	22 50 45.92	18 18.46	19.13	0.67
20	19 14.03	14 17.25	17.87	0.62
24	22 4 38.56	15 25.60	25.90	0.30
29	21 49 35.01	20 2.34	2.78	0.44
31	44 26.88	22 46.46	46.98	0.52
April 9	26 31.62	22 40 17.23	17.36	0.13
17	17 5.19	23 2 21.67	21.92	0.25
20	13 9.27	10 14.77	15.18	0.41
24	9 53.61	23 22 44.77	45.32	0.55
July 5	16 21.59	4 13 5.86	6.05	0.19
9	19 44.83	4 32 15.87	15.93	0.06
23	33 50.08	5 41 35.24	35.40	0.16
30	41 50.20	6 17 12.56	12.73	0.17
Aug. 2	45 22.31	32 34.90	35.30	0.40
4	47 45.19	42 51.29	51.60	0.31
6	21 50 8.54	6 53 8.14	8.49	0.35
10	54 55.64	7 13 42.24	42.48	0.24
17	22 3 11.00	49 34.84	35.11	0.27
18	4 20.30	7 54 40.89	41.18	— 0.29
30	17 25.34	8 55 6.72	6.89	+ 0.13
Sept. 1	22 19 25.47	9 5 0.28	0.54	— 0.26
2	22 20 24.66	9 9 56.17	56.29	— 0.12
3	21 2.91	14 51.14	51.24	— 0.10
4	22 20.58	19 45.53	45.35	+ 0.18
6	24 12.70	29 13.06	31.10	— 0.04
8	26 2.21	39 13.97	13.59	+ 0.38
11	28 39.60	9 53 41.44	41.20	0.24

VENUS—Continued.

Date.	Mean time of observation.	Observed.	Naut. Al.	O. — C.
	h. m. s.	h. m. s.	s.	s.
Sept. 13	22 30 20.49	10 3 15.72	15.67	+ 0.05
16	32 46.32	17 31.60	31.60	0.00
17	33 33.58	22 15.55	15.44	0.11
18	34 20.00	26 58.65	58.58	0.07
20	35 50.77	36 22.77	22.77	0.00
27	40 49.78	11 8 58.46	58.15	0.31
28	41 30.54	13 35.89	35.38	0.51
29	42 10.33	18 12.34	12.20	0.14
Oct. 7	47 20.71	54 55.98	55.56	0.42
9	48 36.39	12 4 4.97	4.67	0.30
23	22 57 42.43	13 8 24.24	23.74	+ 0.50

MARS.

Date.	Observed.	Naut. Almanac.	O. — C.
	h. m. s.	s.	s.
January 14	0 54 39.93	39.26	+ 0.67
28	1 27 49.75	49.17	+ 0.58

VESTA.

January 8	4 4 8.04	9.13	— 1.09
10	3 29.06	30.23	1.17
12	2 57.30	58.63	1.33
13	44.39	45.56	1.17
14	33.20	34.29	1.09
19	4.22	5.20	1.08
23	13.07	14.11	1.04
24	4 2 19.73	20.75	— 1.02

JUPITER.

January 3	1 57 2.75	2.60	+ 0.15
4	57 9.60	9.53	+ 0.07
8	57 44.87	44.95	— 0.08
10	58 7.23	7.19	+ 0.04
13	58 46.01	46.12	— 0.11
14	1 59 0.59	0.57	+ 0.02
22	2 1 21.78	21.83	— 0.05
23	1 42.73	42.63	+ 0.10
24	2 4.01	4.10	— 0.09
26	2 49.21	49.05	+ 0.16
28	3 36.66	36.63	+ 0.03
March 11	28 44.59	44.44	— 0.15
18	2 34 10.59	10.47	+ 0.12
April 3	47 32.32	31.77	— 0.55
4	48 24.11	24.04	+ 0.07

JUPITER—Continued.

Date.	Observed.	Naut. Al.	O. — C.
	h. m. s.	s.	s.
April 6	2 50 9.54	9.31	+ 0.23
16	59 7.61	7.43	.18
27	3 9 18.78	18.68	.10
December 9	4 37 4.88	4.67	.21
14	34 16.23	16.22	.01
23	4 29 33.93	34.15	+ 0.22

SATURN.

July 10	22 10 57.00	55.39	— 1.61
29	22 6 51.84	50.31	1.53
September 1	21 57 20.96	19.51	1.45
2	57 4.02	2.78	1.24
28	50 52.06	50.55	1.51
30	50 30.31	28.97	1.34
October 5	49 41.98	40.65	1.33
6	49 33.39	31.98	1.41
7	49 24.94	23.67	1.27
8	49 17.08	15.70	1.38
9	49 9.26	8.11	1.15
10	49 1.99	0.83	1.16
15	48 31.38	29.99	1.39
17	48 21.48	20.29	1.19
26	47 57.18	55.91	1.27
28	47 56.21	54.87	1.34
29	47 56.17	54.94	1.23
November 16	21 49 5.79	4.65	— 1.14

URANUS.

January 3	0 24 51.34	59.13	7.79
4	24 55.05	2.79	7.74
September 16	48 51.91	0.61	8.70
21	48 9.60	18.31	8.71
October 5	46 6.03	14.73	8.70
8	45 39.18	47.90	8.72
16	44 28.51	37.11	8.60
26	0 43 4.03	12.60	8.57

NEPTUNE.

October 24	21 51 30.84	30.52	+ .32
25	29.10	28.90	.20
26	27.63	27.41	.22
28	24.91	24.80	+ .11
29	23.68	23.69	— .01
November 10	20.41	20.37	+ .04
16	25.75	25.82	— .07
23	51 38.27	38.22	+ .05
December 3	52 7.04	6.95	+ .09
4	10.52	10.51	+ .01

DECLINATIONS AND SEMI-DIAMETERS

OF THE

SUN, MOON AND PLANETS,

OBSERVED WITH

THE MURAL CIRCLE,

1846.

NATIONAL OBSERVATORY.

SUN.

MEAN TIME—WASHINGTON.			Limb observed.	APPARENT DECLINATIONS			VERTICAL SEMI-DIAMETERS		
1846.		Equation of time.		Observed.	Comp'd.	C — O	Observed.	Comp'd.	C — 0
		m s		° ′ ″	″	″	′ ″	″	″
January	3	+ 4 52.6	S.	— 22 49 7.57	6.51	. .	16 . .	17.25	. .
	5	5 47.0	S.	22 36 16.95	17.54	. .	. .	17.23	. .
	8	7 5.0	S.	22 13 43.66	43.76	. .	. .	17.15	. .
	11	8 18.2		21 47 14.35	14.92	— 0.57	17.13	17.02	— 0.11
	13	9 3.9		21 27 27.20	28.30	— 1.10	17.60	16.90	0.70
	14	9 25.9		21 16 58.32	57.63	+ 0.69	19.06	16.83	2.23
	15	9 47.1		21 6 1.08	2.38	— 1.30	18.32	16.75	1.57
	19	11 5.4	S.	20 18 22.53	22.04	. .	. .	16.40	. .
	22	11 56.5		19 38 33.98	34.60	0.62	17.73	16.08	1.65
	23	12 12.0		19 24 32.62	34.55	1.93	17.46	15.96	1.50
	24	12 26.8		19 10 11.13	12.98	1.85	. .	15.85	. .
	28	13 17.8		18 9 18.31	19.78	1.47	17.39	15.34	2.05
February	4	14 15.2		16 10 31.12	32.02	0.90	14.99	14.32	0.67
	10	14 32.1		14 17 47.62	49.01	— 1.39	14.13	13.29	0.84
	12	14 31.3		13 38 19.50	16.67	+ 2.83	. .	12.90	. .
	13	14 29.8		13 18 9.45	10.23	— 0.78	14.72	12.70	2.02
	17	14 16.5		11 55 38.81	38.15	+ 0.66	14.41	11.86	2.55
	18	14 11.5	S.	11 34 28.59	30.52	. .	. .	11.64	. .
	21	13 52.4		10 30 4.51	3.85	+ 0.66	11.80	10.96	0.84
	23	13 36.4		9 46 15.90	16.75	— 0.85	13.20	10.50	2.70
March	3	12 9.7	N.	6 45 45.65	47.48	. .	. .	8.60	. .
	4	11 56.5		6 22 43.04	44.67	1.63	10.91	8.36	2.55
	6	11 28.8		5 36 22.45	23.66	— 1.21	9.31	7.86	1.45
	7	11 14.2		5 13 6.45	6.32	+ 0.13	9.55	7.61	1.94
	9	10 43.9		4 26 19.38	20.06	— 0.68	. .	7.10	. .
	19	+ 7 54.4		— 0 30 5.10	6.89	1.79	16 5.03	4.41	0.62
April	16	— 0 15.0		+ 10 9 41.66	40.72	0.94	15 59.51	56.76	2.75
	17	0 29.4	S.	10 30 49.95	50.46	. .	. .	56.49	. .
	18	0 43.4		10 51 51.23	49.82	1.41	57.67	56.22	1.45
	21	1 22.8		11 53 44.16	43.09	— 1.07	57.41	55.43	1.98
	22	1 35.0		12 13 57.46	57.96	+ 0.50	56.70	55.17	1.53
	23	1 46.7		12 34 1.14	0.88	— 0.26	55.98	54.93	1.05
	27	2 29.0		13 52 5.59	6.07	+ 0.48	56.40	53.92	2.48
	30	2 55.5		14 48 16.92	17.53	0.61	56.61	53.22	3.39
May	1	3 3.3		15 6 31.60	32.42	0.82	54.66	52.99	1.67
	2	3 10.5		15 24 31.77	32.32	0.55	55.01	52.76	2.25
	4	3 23.5		15 59 45.43	46.06	0.63	56.52	52.30	4.22
	5	3 29.2		16 16 58.81	59.22	0.41	52.84	52.09	0.75
	12	3 53.4	S.	18 9 38.49	40.86	. .	. .	50.61	. .
	13	3 54.6		18 24 35.51	36.21	0.70	51.07	50.40	0.67
	19	3 49.2		19 47 27.46	29.95	2.49	51.42	49.22	2.20
	20	3 46.3		20 0 8.46	10.00	+ 1.54	51.03	49.04	1.99
	21	3 42.8		20 12 29.87	29.59	— 0.28	51.72	48.86	2.86
	25	3 23.4		20 58 17.72	19.13	+ 1.41	49.64	48.18	1.46
June	3	2 12.4		22 19 59.59	60.10	0.51	50.57	46.94	3.63
	4	2 2.5		22 27 9.45	10.07	0.62	48.25	46.82	1.43
	6	1 41.8		22 40 17.12	19.26	2.14	48.37	46.59	1.78
	8	— 1 19.9		22 51 51.27	53.20	1.93	48.07	46.38	1.69
	16	+ 0 17.1		23 21 56.02	57.81	1.79	47.72	45.65	2.07
	19	0 56.0		23 26 28.19	28.31	0.12	47.12	45.44	1.68
	20	1 9.0		23 27 6.79	8.91	2.12	47.19	45.38	1.81
	23	1 48.2		23 26 39.92	41.68	1.76	47.26	45.23	2.03
	27	2 39.4		23 20 17.84	18.83	0.99	47.95	45.11	2.84
July	6	4 22.0		22 42 8.66	9.06	0.40	47.69	45.14	2.55
	7	4 31.8		22 35 54.04	54.80	0.76	46.98	45.16	1.82
	8	4 41.3		22 29 14.67	17.09	2.42	47.62	45.18	2.44
	9	4 50.3		22 22 15.69	16.00	0.31	48.02	45.21	2.81
	10	4 59.0		22 14 51.33	51.77	0.44	48.48	45.24	3.24
	13	5 22.4		21 50 19.23	21.63	2.40	48.12	45.36	2.76
	14	5 29.3		21 41 25.49	26.34	+ 0.85	47.52	45.40	2.12
	15	5 35.7		21 32 9.20	8.78	— 0.42	47.75	45.45	2.30
	16	5 41.7		21 22 29.71	29.16	— 0.55	15 48.34	45.50	2.84
	20	+ 6 0.5		+ 20 40 13.33	14.34	+ 1.01	15 48.14	45.76	— 2.38

SUN—Continued.

MEAN TIME—WASHINGTON.		Limb observed.	APPARENT DECLINATIONS			VERTICAL SEMI-DIAMETERS		
1846.	Equation of time.		Observed.	Comp'd.	C — O	Observed.	Comp'd.	C — O
	m s		° ′ ″	″	″	′ ″	″	″
21	+ 6 3.8		+ 20 28 48.35	47.79	— 0.56	15 47.28	45.84	— 1.44
24	6 10.6		19 52 23.85	25.16	+ 1.31	49.16	46.11	3.05
25	6 11.7		19 39 36.89	37.64	+ 0.75	50.40	46.21	4.19
30	6 8.0		18 30 53.74	51.74	— 2.00	47.90	46.79	1.11
st 1	6 2.2		18 1 10.28	12.20	+ 1.92	48.80	46.99	1.81
3	5 53.9		17 30 20.12	22.28	2.16	49.21	47.26	1.95
4	5 48.9		17 14 29.88	31.55	1.67	51.49	47.40	4.09
5	5 43.2		16 58 22.55	24.11	1.56	49.94	47.55	2.39
6	5 36.9	N.	16 42 3.48	0.20	. .	. .	47.69	. .
11	4 56.8	S.	15 16 0.56	3.32	. .	. .	48.48	. .
12	+ 4 47.0		14 58 4.74	6.58	1.84	50.73	48.63	2.10
nber 5	— 1 25.3		6 47 37.94	39.46	1.52	56.35	53.72	2.63
7	2 5.5		6 2 50.25	52.50	2.25	58.44	54.20	4.24
15	4 51.7	N.	3 0 8.57	7.09	. .	. .	56.18	. .
16	5 12.8		2 36 54.80	57.20	2.40	58.51	56.45	2.06
21	6 57.8		0 40 26.66	28.14	1.48	. .	57.77	. .
22	7 18.6		+ 0 17 2.80	4.79	1.99	60.44	58.04	2.40
23	7 39.3	S.	— 0 6 21.56	19.47	. .	. .	58.32	. .
25	8 20.4		0 53 11.00	9.64	1.36	15 60.42	58.87	1.55
28	9 20.8	S.	2 3 28.11	23.51	. .	. .	59.71	. .
er 1	10 19.3		3 13 28.19	27.23	0.96	16 2.77	0.55	2.22
5	11 33.3		4 46 23.11	20.86	2.25	4.04	1.67	2.37
6	11 50.9		5 9 27.58	26.30	1.28	2.96	1.95	1.01
7	12 8.1		5 32 28.72	27.93	0.79	2.83	2.22	0.61
17	14 33.8		9 17 53.17	52.78	0.39	7.70	4.92	2.78
19	14 56.2		10 1 36.29	34.48	1.81	9.46	5.46	4.00
nber 16	15 1.5		18 47 12.68	9.10	3.58	. .	12.25	. .
24	13 4.3		20 35 40.51	39.36	+ 1.15	15.00	13.80	1.20
28	11 47.4		21 20 53.89	54.14	— 0.25	15.05	14.50	0.55
30	11 4.7		21 41 7.42	7.04	+ 0.38	17.14	14.82	2.32
nber 4	9 31.8		22 16 30.37	31.95	— 1.58	17.61	15.40	2.21
5	9 7.1		22 24 20.83	18.87	+ 1.96	. .	15.53	. .
11	6 28.0		23 1 44.35	42.95	1.40	18.65	16.19	2.46
12	6 0.0		23 6 22.22	22.16	+ 0.06	18.24	16.29	1.95
14	5 2.8		23 14 17.26	17.60	— 0.34	20.43	16.46	3.97
15	4 33.7		23 17 33.82	33.75	+ 0.07	19.73	16.54	3.19
16	4 4.4		23 20 22.94	21.95	+ 0.99	19.27	16.62	2.65
18	3 5.2		23 24 32.69	33.99	— 1.30	17.90	16.77	1.13
21	1 35.3		23 27 20.43	20.66	— 0.23	18.83	16.96	1.87
22	1 5.2		23 27 19.64	19.60	+ 0.04	19.30	17.01	2.29
23	— 0 35.2		23 26 49.82	50.26	— 0.44	19.14	17.07	1.07
28	+ 1 53.7	S.	23 17 20.99	19.85	. .	. .	17.25	. .
29	2 23.0		23 14 1.20	1.37	— 0.17	19.94	17.27	2.67
30	+ 2 52.0		— 23 10 14.01	15.00	— 0.99	16 19.03	17.29	— 2.74

MOON.

MEAN TIME—WASHINGTON. 1846.			Limb observed.	APPARENT DECLINATIONS				Cor. applied for def. illumination.	VERTICAL SEMI-DIAMETER		
				Observed.	Comp'd.	C — O			Observed.	Comp'd.	C –
						N. L.	S. L.				
		h m s		° ′ ″	″	″	″	″	′ ″	″	″
January	3	5 20 39.9	S.	+ 4 59 44.28	46.69	. .	+ 2.41	. .	15 . .	47.60	.
	8	9 23 54.7	N.	19 50 48.90	46.02	− 2.88	. .	. .	14 . .	53.70	.
	10	11 1 12.2	N.	19 26 31.56	25.81	5.75	. .	+ 1.36	14 49.14	44.65	− 4.4
		"	S.	22.58	"	. .	3.23	. .			
	14	14 2 31.0	N.	8 45 64.57	61.49	3.08	. .	+ 24.10	14 48.02	44.89	3.1
		"	S.	58.32	"	. .	3.17	. .			
February	3*	6 31 25.5	S.	17 42 1.36	3.96	. .	2.60	. .	15 . .	9.98	.
	4	7 20 45.1	S.	19 19 15.30	15.59	. .	0.29	. .	14 . .	59.59	.
March	5*	6 53 26.0	S.	19 36 48.55	53.97	. .	5.42	. .	14 . .	52.97	.
	7	8 28 10.0	S.	16 55 6.37	14.83	. .	8.46	− 2.71	14 48.70	44.27	4.4
		"	N.	15.23	"	− 0.40	. .	. .			
	10	10 41 32.2	N.	7 33 26.20	30.48	+ 4.26	. .	. .	14 51.98	48.88	3.1
		"	S.	20.01	"	. .	10.47	− 2.21			
April	4	7 8 24.7	N.	+ 15 18 4.76	2.68	− 2.08	. .	. .	14 . .	46.20	.
	9	10 47 52.4	N.	− 3 21 12.05	9.13	+ 2.92	. .	. .	15 . .	8.32	.
	13	14 4 40.8	S.	− 17 29 34.09	22.08	. .	12.01	. .	15 46.88	43.14	3.
		"	N.	26.60	"	+ 4.52	. .	+ 4.72			
	24†	23 58 13.5	N.	+ 13 26 57.46	48.19	− 9.27	. .	. .	15 . .	46.50	.
May	11	12 50 48.3	S.	− 18 36 63.98	51.61	. .	12.37	. .	15 63.16	57.46	5.
		"	N.	52.58	"	+ 0.97	. .	. .			
June	6	9 42 7.2	N.	15 11 45.04	41.81	3.28	. .	. .	15 . .	44.94	.
July	6	10 15 53.9	N.	19 29 28.47	20.66	7.81	. .	. .	16 . .	16.26	.
	7‡	11 16 29.6	N.	19 0 53.46	43.98	9.48	. .	. .	16 . .	27.68	.
	8	12 17 28.5	S.	17 6 33.52	16.62	. .	16.90	− 4.34	16 38.55	34.87	3.
		"	N.	26.17	"	9.55	. .	. .			
	9‖	13 17 15.5	N.	13 54 41.19	33.63	7.56	. .	. .	16 . .	36.96	.
August	3§	8 57 46.1	S.	19 17 65 67	49.84	. .	15.83	− 2.22	16 19.11	14.60	4.
		"	N.	56.65	"	6.81	. .	. .			
	4	9 57 49.1	N.	18 11 25.12	15.50	9.62	. .	. .	16 . .	28.26	.
	5	10 58 13.3	S.	15.42 22.57	5.94	. .	16.63	− 0.48	16 41.67	38.10	3.
		"	N.	15.43	"	9.49	. .	. .			
	7	12 55 20.7	S.	7 27 42.20	20.35	. .	21.85	− 12.31	16 48.88	41.73	(7.
		"	N.	27.91	"	7.56	. .	. .			
	31	7 42 1.2	N.	18 41 38.13	32.74	+ 5.39	. .	. .	16 . .	7.57	.
Sept.	2	9 38 59.2	S.	13 57 52.26	42.86	. .	9.40	. .	16 . .	32.62	.
	29	7 26 8.6	S.	15 15 27.00	15.95	. .	11.05	. .	16 . .	11.80	.
	30	8 22 12.8	S.	11 48 17.27	7.32	. .	9.95	. .	16 . .	21.42	.
October	1¶	9 17 42.5	S.	− 7 30 16.76	6.60	. .	10.16	. .	16 . .	28.27	.
	5	12 56 22.8	N.	+ 11 28 61.97	58.59	− 3.38	. .	. .	16 16.87	13.14	3
		"	S.	54.51	"	. .	4.08	− 5.35			
	29	8 2 2.8	S.	− 4 41 46.45	39.30	. .	7.15	. .	16 . .	15.41	.
Nov.	30	10 17 59.9	N.	+ 15 5 17.67	8.76	− 8.91	. .	+ 8.69	15 54.38	49.51	− 4
		"	S.	7.93	"	. .	+ 0.83	. .			
Dec.	26	7 20 53.5	S.	+ 10 21 35.24	34.78	. .	− 0.46	. .	15 . .	51.79	.

* Poorly defined.
† On Sun's disk.
‡ Red. to mer. uncertain.

‖ Through clouds.
§ Luminous points observed.
¶ Through clouds.

MERCURY.

MEAN TIME—WASHINGTON.				Limb observed.	APPARENT DECLINATIONS			VERTICAL SEMI-DIAMETERS		
					Observed.	Comp'd.	C — O	Observed.	Comp'd.	C — O
			h m s		° ′ ″	″	″	″	″	″
846.	January	27	22 39 33.5		— 22 41 30 18	35.48	— 5.30	3.67	2.76	— 0.91
	February	9	23 8 55.4	Center	20 37 55.41	58 94	3.53	. .	. .	. .
		11	23 14 3.3	"	19 59 10.96	16 58	5.62	. .	. .	. .
		17	23 30 2.3	"	17 30 8.66	12.54	3.88	. .	. .	. .
		22	23 43 56.7		— 14 47 45.72	48.68	— 2.96	3.51	2.35	1.16
	April	3	1 7 33.9	"	+ 14 54 39.85	40.55	+ 0.70	. .	. .	. .
	May	19	22 20 1.1	"	9 46 16.07	13.97	— 2.10	. .	. .	. .
	July	15	1 43 21.5	"	16 50 59.87	54.40	— 5 47	. .	. .	. .
	September	6	22 52 58.1		11 47 0.67	4.17	+ 3.50	4.66	3.86	0.80
		21	23 10 16.7	"	6 51 8.34	7.52	— 0.82	. .	. .	. .
		22	23 12 58.0		6 10 22 60	22.32	0.28	3.47	2.59	0.88
		23	23 15 40.8	"	5 28 18 45	16.52	1.93	. .	. .	. .
		24	23 18 24.1		+ 4 45 3.84	3.04	— 0.80	2.79	2.52	— 0.27

VENUS.

846.	January	8	3 11 43.9		— 9 58 51.63	40.55	+ 11.08	15.84	15.35	— 0.49
		22	2 51 18.6		4 11 27.92	16.57	11.35	20.49	18.79	1.70
		23	2 49 13.8		3 48 12.69	2.93	9.76	20.68	19.08	1.60
		24	2 47 3.2		3 25 19.23	10.09	9.14	20.40	19.38	1.02
		26	2 42 18.9		2 40 45.30	34.47	10.83	21.01	19.99	1.02
		28	2 37 19.1		1 57 55.10	44.74	10.36	22.22	20.63	1.59
	February	3	2 19 15.5	S.	— 0 2 53.11	42.03	11.08	. .	22.67	. .
		4	2 15 48.0	S.	+ 0 13 55.34	65.74	10.40	. .	22.03	. .
		10	1 52 4.6	S.	1 36 28.62	38.22	9.60	. .	25.21	. .
		12	1 43 0.0	S.	1 55 58.24	69.17	10.93	. .	25.93	. .
		13	1 38 14.0	S.	2 4 0.95	9.33	8.38	. .	26.28	. .
		17	1 17 45.4	S.	2 23 57.56	64.07	6.51	. .	27.60	. .
		18	1 12 18.0	S.	2 25 42.52	50.04	7.52	. .	27.90	. .
		23	0 43 19.4		2 14 35.00	41.49	6.49	. .	29.12	. .
	March	2	23 53 47.9	S.	+ 0 52 58.25	59.80	+ 1.55	. .	29.74	. .
	April	2	21 39 46.7		— 5 26 42.14	50.78	— 8.64	21.31	20.42	0.89
		8	21 28 9.3		5 26 53.29	62.11	8.82	19.85	18.53	1.32
		17	21 16 5.6		4 38 35.95	43.65	7.70	17.18	16.14	1.04
		20	21 13 9.7		4 10 59.23	66.23	7.00	16.70	15.44	1.26
		21	21 12 16.9		4 0 35.85	44.64	8.79	16.95	15.23	1.72
		24	21 9 54.1		3 26 19.10	25.57	6.47	15.53	14.60	0.93
		26	21 8 30.8		— 3 0 54.14	59.92	— 5.78	15.06	14.21	0.85
	July	12	21 22 29.3		+ 20 31 33.24	40.23	+ 6.99	8.68	7.04	1.64
		15	21 25 23.7		21 2 18.85	23.21	4.36	8.42	6.92	1.50
		19	21 29 29.1		21 35 57.09	62.00	4.91	7.87	6.77	1.10
		30	21 41 50.4		22 21 39.95	44.14	4.19	7.13	6.39	0.74
	August	3	21 46 34.0		22 20 11.83	16.52	4.69	6.82	6.28	0.54
		4	21 47 45.4		22 18 17.03	21.42	4.39	7.14	6.25	0.89
		5	21 48 57.2		22 15 43.80	48.79	4.99	7.45	6.22	1.23
		6	21 50 8.9		22 12 32.72	38.67	5.95	6.87	6.19	0.68
		11	21 56 7.4		21 47 19 71	24.15	4.44	7.00	6.06	0.94
		17	22 3 11.3		20 56 33.61	39.06	5.45	6.22	5.92	0.30
	September	4	22 22 20.5		16 20 4.60	7.37	2.77	6.36	5.56	0.80
		6	22 24 12.8		15 39 5.43	8.40	2.97	6.16	5.52	0.64
		15	22 31 58.5		12 13 47.19	49.22	2.03	5.94	5.38	0.56
		24	22 38 44.9		8 20 12.71	13.99	1.28	5.49	5.26	0.23
		28	22 41 29.1		6 29 31.86	32.68	0.82	5.46	5.22	0.24
	October	5	22 46 4.2		3 8 39.90	40.66	0.76	5.39	5.14	0.25
		9	22 48 36.1		+ 1 11 6.22	6.66	+ 0.44	6.34	5.10	— 1.24

Reductions for defective illumination have been applied to the observations of the North cusp, from January 8, to 28.
South cusp, " April 2, " 26.
South limb, " July 12, " 19.
North limb, " August 11, " Oct 9.

The reductions for the cusp observations stated in the margin of the printed observations, have been revised, and the Declinations and Semi-ameters corrected accordingly.

MEAN TIME—WASHINGTON.				Limb observed.	APPARENT DECLINATIONS			VERTICAL SEMI-DIAMETERS		
					Observed.	Comp'd.	C — O	Observed.	Comp'd.	C — 0
MARS.										
			h m s		° ′ ″	″	″	″	″	″
1846	January	3	5 36 36.4	Center	+ 3 12 52.02	+ 56.11	+ 4.09			
		5	5 33 18.0		3 44 59.70	55.17	5.47	5.02	3.65	— 1.37
		8	5 28 22.6		4 33 4.81	9.82	5.01	4.97	3.57	1.40
		22	5 5 58.9		8 13 31.81	34.17	2.36	4.57	3.24	1.33
		26	4 59 45.9		9 14 48.82	52.88	4.06	4.30	3.16	1.14
		28	4 56 41.4		9 45 7.42	10.97	3.55	3.80	3.12	0.68
	February	3	4 47 35.3		11 14 25 11	27.85	2.74	3.84	3.00	— 0.84
		12	4 34 17.1	Center	13 23 0.97	1.55	0.58	. .	. .	. .
		18	4 25 38.9	"	+ 14 44 31.05	33.13	+ 2.08	. .	. .	. .
VESTA.										
	January	8	8 51 14.0	Center	+ 16 21 17.54	2.85	— 14.69			
		10	8 42 43.4	"	16 26 49.43	34.30	15.13			
		13	8 30 11.1	"	16 35 59.39	19.07	15.32			
		19	8 5 55.4	"	16 54 70.26	54.80	15.46			
		24	7 46 31.3	"	+ 17 12 67.86	54.53	— 13.33			
JUPITER.										
	January	5	6 56 30.6		+ 10 44 7.07	7.77	+ 0.70	20.55	19.98	— 0.57
		8	6 45 10.5		10 47 37.02	37.45	+ 0.43	20.67	19.78	0.89
		10	6 37 40.9		10 50 17.63	17.36	— 0.27	20.56	19.64	0.92
		12	6 30 14.2		10 53 13.53	13.16	0.37	20.76	19.52	1.24
		13	6 26 32.0		10 54 47.86	46.88	— 0.98	20.45	19.45	1.00
		18	6 8 11.6		11 3 31.68	31.89	+ 0.21	19.80	19.13	0.67
		19	6 4 33.7		11 5 27.13	27.97	0.84	21.61	19.07	1.54
		22	5 53 44.1		11 11 36.72	37.41	+ 0.69	18.95	18.88	0.07
		23	5 50 8.8		14 13 47.56	47.43	— 0.13	19.99	18.80	1.19
		24	5 46 34.4		11 16 1.07	0.95	— 0.12	20.30	18.75	1.55
		26	5 39 27.4		11 20 35.49	37.86	+ 2.37	20.17	18.63	1.54
		28	3 32 23.0		11 25 27.26	27.84	+ 0.58	19.86	18.51	1.35
	February	3	5 11 25.1		11 41 11.62	11.16	— 0.46	19.18	18.15	1.03
		4	5 7 57.6	S.	11 43 57.76	58.56	+ 0.80	. .	18.10	. .
		12	5 40 38.2		12 7 53.41	52.21	— 1.20	18.16	17.66	0.50
		17	4 23 51.2		12 27 6.75	5.35	— 1.40	18.39	17.41	0.98
		23	4 3 59.2		12 44 39.75	40.42	+ 0.67	17.75	17.13	— 0.62
	March	12	3 9 8.1		13 48 6.17	5.40	— 0.77	. .	. .	. .
	December	23	10 20 26.8		+ 21 7 51.29	52.57	+ 1.28	. .	. .	. .
SATURN.										
	July	29	13 36 44.2		— 13 17 0.65	11.44	— 10.79	9.95	8.44	— 1.51
	August	3	13 15 57.1		13 24 48.97	58.26	9.29	8.75	. .	. .
		12	12 37 55.4		13 39 20.21	30 47	10.26	8.11	8.50	0.61
		18	12 12 37.1		13 49 10.83	20.71	9.88	9.28	8.51	0.77
		31	11 17 46.8		14 9 53.69	64.21	10.52	8.73	8.49	0.24
	September	1	11 13 33.1		14 11 25.86	35.65	9.79	9.08	8.48	0.60
		7	10 48 20.4		14 20 14.73	25.38	10.65	9.82	8.46	1.36
		8	10 44 9.6		14 21 41.02	50.14	9.12	9.54	8.45	1.09
		25	9 33 19.0		14 42 19.67	28.96	9.29	9.23	8.35	0.88
		28	9 20 56.8		14 45 8.65	20.84	12.19	9.37	8.33	1.04
		29	9 16 39.9		14 46 5.55	14.57	9.02	8.69	8.32	0.37
	October	5	8 52 15.7		14 50 48.96	58.79	9.83	9.40	8.28	1.12
		6	8 48 11.1		14 51 29.87	39.57	9.70	9.17	8.27	0.90
		7	8 44 6.9		14 52 9.76	18.46	8.70	8.81	8.27	0.54
		8	8 40 3.1		14 52 47.87	55.44	7.57	9.45	8.26	1.19
		9	8 35 59.6		14 53 21.77	30.43	8.66	9.22	8.25	0.97
		10	8 31 56.4		14 53 53.92	63.51	9.59	9.01	8.24	0.77
		19	7 55 34.8		— 14 57 21.04	30.27	— 9.23	9.04	8.13	— 0.91

URANUS.

MEAN TIME—WASHINGTON.			APPARENT DECLINATIONS.			VERTICAL SEMI-DIAMETERS.		
			Observed.	Computed.	C. — O.	Observed.	Computed.	C. — O.
		h. m. s.	° ′ ″	″	″	″	″	″
y	3	5 33 19.4	+ 1 56 11.01	52.16	+ 41.15	. . .	. . .	. . .
	5	5 24 35.1	1 57 4.49	45.76	41.27	. . .	. . .	. . .
ıber	25	12 29 18.5	4 20 17.33	64.10	46.77	. . .	. . .	. . .
r	7	11 40 11.2	4 9 3.35	48.86	45.51	1.51	1.96	+ 0.60
	8	11 36 5.4	4 8 7.28	53.68	46.40	2.77	1.96	— 0.81
	23	10 35 57.5	3 54 30.31	76.48	46.17	. . .	. . .	. . .
ber	4	7 45 39.1	3 29 13.31	55.92	+ 42.61	. . .	. . .	. . .

NEPTUNE.

MEAN TIME—WASHINGTON.			APPARENT DECLINATIONS.		
			Observed.	Computed.	C. — O.
		h. m. s.	° ′ ″	″	″
r	24	7 39 23.0	— 13 33 23.25	24.88	— 1.63
	25	7 35 25.5	13 33 31.46	32.93	1.47
	28	7 24 33.5	13 33 50.05	53.10	3.05
	29	7 19 36.7	13 33 56.86	58.47	1.61
ıber	21	5 49 21.1	13 32 50.76	53.48	2.72
	23	5 41 33.4	13 32 27.61	30.53	2.92
ber	3	5 2 43.0	— 13 29 53.88	55.61	— 1.73

RIGHT ASCENSIONS, DECLINATIONS, AND SEMI-DIAMETERS

OF THE

SUN, MOON, AND PLANETS,

OBSERVED WITH

HE MERIDIAN CIRCLE,

1846.

NATIONAL OBSERVATORY.

MERCURY.

MEAN TIME—WASHINGTON.			Limb observed.	RIGHT ASCENSIONS.			SEMI-DIAMETERS.			Limb observed.	DECLINATIONS.			SEMI-DIAMETERS.		
				Observed.	Comp.	C. — O.	Obs'd	Comp.	C.—O.		Observed.	Comp.	C. — O.	Obs'd.	Comp.	C.—O.
1846.		h. m. s.		h. m. s.	s.	s.	s.	s.	s.		° ′ ″	″	″	″	″	″
Jan.	27	22 39 33.35	Center	19 9 39.14	39.27	+ 0.13	..	..	..	Center	—22 41 32.81	35.48	— 2.67	..	..	..
Feb.	9	23 8 55.62	Center	20 30 21.44	21.23	— 0.21	..	..	..	Center	20 37 54.23	58.94	4.71	..	..	..
	11	23 14 3.61	Center	20 43 23.39	23.02	— 0.37	..	..	..	Center	19 59 10.25	16.58	6.33	..	..	..
	20	23 38 18.88	Center	21 43 11.62	11.77	+ 0.15	..	..	..	Center	15 56 53.38	56.79	— 3.41	..	..	..
Apr.	3	1 7 33.39	I.	1 54 20.33	19.94	— 0.39	..	0.28	..	S.	14 54 41.38	40.55	+ 0.83	..	4.02	..
	6	1 0 29.31	I.	1 59 3.85	3.91	+ 0.06	..	0.30	..	S.	—15 31 11.47	8.95	+ 2.52	..	4.39	..
May	18	22 19 44.08	II.	2 7 24.02	24.44	0.42	..	0.25	..		+ 9 21 50.35	47.25	— 3.10	4.32	3.73	—0.59
	20	22 20 28.25	II.	2 16 1.43	1.82	0.39	..	0.24	..	N.	10 12 3.33	0.03	3.30	..	3.59	..
July	6	1 19 45.38	I.	8 17 9.62	10.50	0.88	..	0.19	..		21 31 54.42	52.52	1.90	2.68	2.69	+0.01
	7	1 23 8.20	Center	8 24 29.56	30.21	0.65	..	..	..	Center	21 4 14.42	13.13	1.29	..	..	..
	11	1 34 43.74	Center	8 51 53.22	53.79	0.57	..	..	..	Center	19 3 21.56	17.42	4.14	..	..	..
	24	1 52 22.77	I.	10 0 50.38	50.47	0.09	..	0.23	..	N.	11 40 68.67	58.54	—10.13	..	3.44	..
Sept.	4	22 57 31.77	II.	9 55 2.48	2.60	0.12	..	0.29	..	N.	11 26 13.19	18.13	+ 4.94	..	4.15	..
	6	22 52 57.66	II.	9 58 20.73	21.17	0.44	..	0.27	..	S.	11 47 3.27	4.17	+ 0.90	3.86	3.86	0.00
	15	22 55 57.04	II.	10 36 49.57	50.90	0.33	..	0.20	..	S.	10 14 16.59	13.30	— 3.29	..	3.00	..
	20	23 7 37.35	Center	11 8 14.55	15.20	0.65	..	..	..	Center	7 30 20.91	18.60	— 2.31	..	..	..
	21	23 10 16.52	II.	11 14 50.72	50.92	0.20	..	0.18	..	..	. . . . .	..	. .	..	..	..
	22	23 12 57.38	II.	11 21 28.57	29.25	0.68	..	0.17	..		6 10 21.60	22.32	+ 0.72	2.12	2.59	+0.47
	23	23 15 40.47	II.	11 28 8.65	9.02	0.37	..	0.17	..	S. L.	5 28 15.84	16.52	+ 0.68	..	2.55	..
	24	23 18 23.79	II.	11 34 48.97	49.27	+ 0.30	..	0.17	..		+ 4 45 6.27	3.04	— 3.23	3.05	2.52	—0.53

VENUS.

MEAN TIME—WASHINGTON.			Limb observed.	RIGHT ASCENSIONS.			SEMI-DIAMETERS.			Limb observed.	DECLINATIONS.			SEMI-DIAMETERS.		
				Observed.	Comp.	C. — O.	Obs'd	Comp.	C.—O.		Observed.	Comp.	C. — O.	Obs'd.	Comp.	C.—O.
Jan.	5	3 14 18.53	I.	22 14 28.66	28.40	—0.26	..	1.00	..	S.	—11 15 21.95	9.08	+12.87	..	14.75	..
	8	3 11 43.39	Center	22 23 42.77	43.25	.48	..	..	..	Center	9 58 54.07	40.55	13.52	..	15.35	..
	13	3 6 8.41	I.	22 37 49.65	49.48	.17	..	1.11	..	S.	7 51 49.30	33.62	15.68	..	16.46	..
	14	3 4 49.27	I.	22 40 26.85	26.04	.81	..	1.12	..	Center	7 26 37.00	23.05	13.95	..	16.72	..
	19	2 57 0.54	I.	22 52 19.62	19.19	.43	..	1.21	..	S.	5 22 61.76	46.27	+14.49	..	17.96	..
	22	2 51 18.96	I.	22 58 26.77	26.43	.34	..	1.25	..	Center	4 11 12.82	16.57	— 3.75	..	18.79	..
	23	2 49 14.15	I.	23 0 18.18	17.79	.39	..	1.27	..	S.	3 48 16.27	2.93	+13.34	..	19.08	..
	24	2 47 3.54	I.	23 2 3.76	3.40	.36	..	1.29	..	S.	3 25 22.46	10.09	12.37	..	19.38	..
	28	2 37 19.30	I.	23 8 4.15	3.98	.17	..	1.37	..	S.	1 57 56.61	44.74	11.87	..	20.63	..
Feb.	3	2 19 15.79	I.	23 13 37.00	36.71	.29	..	1.50	..	S.	— 0 2 53.11	42.03	11.03	..	22.67	..
	4	2 15 48.10	I.	23 14 5.30	5.19	.11	..	1.54	..	S.	+ 0 13 54.60	65.74	11.14	..	23.03	..
	10	1 52 4.98	I.	23 13 57.60	57.25	—0.35	..	1.69	..	S.	1 36 28.89	38.22	9.33	..	25.21	..
	13	1 38 13.97	I.	23 10 53.98	54.04	+0.06	..	1.75	..	S.	2 4 1.49	9.33	7.84	..	26.28	..
	20	1 1 1.23	I.	23 2 11.01	11.03	.02	..	1.89	..	S.	2 25 15.23	22.92	7.69	..	28.45	..
	21	0 55 12.47	I.	23 0 17.84	18.33	.49	..	1.91	..	S.	2 23 0.82	8.83	8.01	..	28.70	..
	23	0 43 19.24	I.	22 56 15.77	15.88	+0.11	..	1.94	..	S.	2 14 32.07	41.49	+ 9.42	..	29.12	..
Mar.	2	23 53 47.94	I.	22 38 8.76	8.66	—0.10	..	1.98	..	S.	+ 0 52 62.22	59.80	— 2.42	..	29.74	..
	29	21 49 35.04	II.	22 20 2.35	2.79	+0.44	..	1.46	..	N.	— 5 10 55.34	61.66	6.32	..	21.80	..
April	2	21 39 46.09	II.	22 25 58.00	58.56	.56	..	1.36	..	N.	5 26 38.03	50.78	12.75	..	20.42	..
	8	21 28 8.96	II.	22 37 58.27	58.66	.39	..	1.24	..	..	. . . . .	..	. .	..	..	..
	9	21 26 31.46	I.	22 40 17.06	17.37	+0.31	..	1.22	..		5 24 19.41	26.24	6.83	19.11	18.24	—0.87
	13	21 20 47.01	II.	22 50 17.88	17.78	—0.10	..	1.16	..	N.	5 6 44.26	56.15	11.89	..	17.14	..
	15	21 17 18.96	II.	22 55 42.53	42.61	+0.08	..	1.12	..		4 53 54.29	66.90	12.61	16.75	16.63	..
	16	21 17 10.31	II.	22 58 30.25	30.54	.29	..	1.11	..	N.	4 46 35.53	44.09	9.56	..	16.38	..
	17	21 16 5.36	II.	23 1 21.67	21.97	.30	..	1.08	..	N.	4 38 35.57	43.63	8.06	..	16.22	..
	19	21 14 4.53	II.	23 7 13.62	14.41	.79	..	1.06	..		4 20 45.60	53.80	8.20	16.49	15.67	0.82
	20	21 13 9.30	II.	23 10 14.79	15.19	.40	..	1.05	..	N.	4 11 0.21	6.23	6.02	..	15.44	..
	21	21 12 16.34	II.	23 13 18.23	18.81	.58	..	1.03	..		4 0 37.26	44.64	7.38	17.48	15.23	2.25
May	3	21 4 40.94	II.	23 53 0.24	0.83	.59	..	0.87	..		1 17 39.67	45.94	— 6.27	14.59	12.97	1.62
	20	21 0 25.70	II.	0 55 45.73	45.99	+0.26	..	0.72	..		4 1 8.78	3.10	+ 5.68	11.49	10.69	—0.80
June	3	21 1 3.32	II.	1 51 35.24	32.82	(—2.42)	..	0.64	..	N.	+ 8 59 5.25	3.40	— 1.85	..	9.34	..
	4	21 1 11.27	II.	1 55 39.77	39.80	+0.03	..	0.63	..		9 20 31.49	11.22	—20.27	10.29	9.25	—1.04
July	6	21 17 10.42	II.	4 17 51.36	51.72	+0.36	..	0.52	..		19 17 9.12	14.32	+ 5.20	8.82	7.30	1.52
	8	21 18 52.54	II.	4 27 26.88	26.69	—0.19	..	0.51	..	N.	19 43 52.88	52.88	— 0.06	..	7.21	..
	10	21 20 38.03	II.	4 37 5.78	6.45	+0.67	..	0.51	..		20 8 38.13	43.11	+ 4.98	7.87	7.12	—0.75
	12	21 22 28.87	II.	4 46 50.03	50.68	.65	..	0.50	..	Center	20 31 34.73	40.23	5.50	..	7.04	..
	15	21 25 23.18	II.	5 1 34.49	35.06	.57	..	0.50	..		21 2 19.15	23.21	4.06	6.39	6.92	+0.53
	29	21 40 40.78	..	. . . .	..	. .	..	..	..	N.	22 20 32.27	33.59	+ 1.32	..	6.43	..
	30	21 41 49.72	II.	6 17 12.07	12.75	.68	..	0.45	..	N.	22 21 46.30	..	— 2.16	..	6.39	..

VENUS—Continued.

MEAN TIME—WASHINGTON.		Limb observed.	RIGHT ASCENSIONS.			SEMI-DIAMETERS.			Limb observed.	DECLINATIONS.			SEMI-DIAMETERS.		
			Observed.	Comp.	C. — O.	Obs'd.	Comp.	C. — O.		Observed.	Comp.	C. — O.	Obs'd.	Comp.	C. — O.
346.	h. m. s.		h. m. s.	s.	s.	s.	s.	s.		° ' "	"	"	"	"	"
2	21 45 22.33	II.	6 32 34.92	35.32	+0.40	..	0.46	..	N.	+22 21 34.31	34.21	— 0.10	..	6.30	..
3	21 46 33.51	II.	6 37 42.86	43.38	.52	..	0.45	..		22 20 18.90	16.52	— 2.38	6.90	6.28	—0.62
4	21 47 45.53	II.	6 42 51.62	51.62	.00	..	0.45	..	..	. . . .	..	..	..	..	..
5	21 48 56.80	II.	6 47 59.65	60.00	.35	..	0.45	..		22 15 44.96	48.79	+ 3.83	7.01	6.22	0.79
6	21 50 8.68	II.	6 53 8.27	8.50	.23	..	0.45	..	N.	22 12 35.67	38.67	3.00	..	6.19	..
11	21 56 7.09	II.	7 18 50.43	50.75	.32	..	0.44	..	N.	21 47 22.18	24.15	1.97	..	6.06	..
12	21 57 18.25	II.	7 23 58.35	58.88	.53	..	0.44	..	N.	21 40 26.51	28.97	2.46	...	6.04	..
31	22 18 25.86	II.	9 0 3.94	3.99	.05	..	0.39	..	..	. . . .	..	..	..	..	..
t. 3	22 21 22.77	II.	9 14 50.99	51.26	.26	..	0.39	..	..	. . . .	..	..	..	..	..
4	22 22 20.05	II.	9 19 45.01	45.37	.36	..	0.39	..	..	. . . .	..	..	..	..	..
13	22 30 20.17	II.	10 3 15.39	15.68	.29	..	0.37	..	S.	13 2 6.66	10.83	4.17	..	5.43	..
15	22 31 59.18	II.	10 12 46.77	47.07	.30	..	0.37	..		12 13 48.19	49.22	0.03	6.39	5.38	1.01
20	22 35 50.51	II.	10 36 22.50	22.79	+0.29	..	0.37	..		10 6 58.37	60.34	1.97	6.29	5.31	0.98
21	22 36 35.36	II.	10 41 4.02	3.89	—0.13	..	0.37	..	S.	9 40 40.56	43.25	2.69	..	5.30	..
22	22 37 18.74	II.	10 45 44.07	44.36	+0.29	..	0.36	..		9 14 9.11	9.32	0.21	6.48	5.29	1.19
23	22 38 2.24	II.	10 50 24.24	24.24	.00	..	0.36	..	S.	8 47 16.30	19.34	3.04	..	5.28	..
24	22 38 45.12	II.	10 55 3.79	3.53	—0.26	..	0.36	..	N.	8 20 13.46	13.99	0.53	..	6.26	..
28	22 41 29.94	II.	11 13 35.27	35.37	+0.10	..	0.35	..		+ 6 29 31.15	32.68	+ 1.53	6.11	5.22	—0.89

MARS.

. 5	5 35 18.23	I.	0 35 51.52	50.90	+ 0.62	..	0.24	..	S.	+ 3 44 58.03	65.17	+ 7.14	..	3.65	..
8	5 28 23.14	I.	0 40 44.97	44.46	— 0.51	..	0.24	..	Center	4 33 4.23	9.82	5.59	..	3.57	..
26	4 59 46.59	I.	1 23 1.73	1.11	0.62	..	0.21	..	S.	9 14 47.88	52.88	5.00	..	3.16	..
28	5 56 41.85	I.	1 27 49.59	49.17	0.42	..	0.21	..	S.	9 45 7.95	10.97	3.02	..	3.12	..
. 18	4 25 39.51	I.	2 19 29.79	29.14	0.65	..	0.19	..	S.	14 44 32.89	33.13	0.24	..	2.75	..
r. 5	4 4 56.07	I.	2 57 51.24	50.59	— 0.65	..	0.18	..	S.	+17 50 54.65	58.36	+ 3.71	..	2.54	..

VESTA.

. 10	8 42 42.14		4 3 29.09	30.27	+ 1.18	..	..	..		+16 26 45.02	34.30	—10.72	..	..	..
13	8 30 10.23		4 2 44.70	45.66	0.96	..	..	..		16 35 33.91	24.07	9.84	..	..	..
23	7 50 19.61		4 2 13.10	14.11	1.01	..	..	..		17 9 26.31	11.31	15.00	..	..	..
24	7 46 30.40		4 2 19.82	20.75	+ 0.93	..	..	..		+17 12 68.93	54.53	—14.40	..	..	..

JUPITER.

8	6 45 10.13	I.	1 57 44.57	44.93	+ 0.36	..	1.45	..	..	+10 47 33.01	37.45	+4.44	..	..	..
10	6 37 40.98		1 58 7.30	7.18	— 0.12	1.51	1.44	— 0.07	S.	10 50 18.98	17.36	—1.62	..	19.64	..
12	6 30 14.49		1 58 32.71	32.40	.31	1.48	1.43	.05	N.	10 54 32.43	13.16	(19.27)	..	19.52	..
14	6 22 50.57		1 59 0.68	0.57	.11	1.55	1.42	.13	N.	10 56 28.94	24.93	4.01	..	19.39	..
22	5 53 44.29		2 1 22.07	21.83	.24	1.40	1.38	.02	..	11 11 37.84	37.41	—0.43	..	..	..
23	5 50 9.12		2 1 42.87	42.60	— 0.27	1.39	1.38	.01	S.	11 13 42.34	47.43	+5.09	..	18.80	..
24	5 46 33.72		2 2 3.43	4.15	+ 0.72	1.67	1.37	.30	S.	11 16 0.51	0.95	+0.44	..	18.75	..
26	5 39 27.58		2 2 49.23	49.10	— .13	1.52	1.37	— 0.15	S.	11 20 39.29	37.86	—1.43	..	18.63	..
28	5 32 23.15		2 3 36.75	36.69	.06	1.26	1.36	+ 0.10	S.	11 25 27.52	27.84	+0.32	..	18.51	..
. 18	4 20 31.57		2 14 21.01	20.73	.28	1.25	1.28	.03	..	12 27 28.62	26.30	—2.32	..	..	..
23	4 3 59.43		2 17 28.92	28.74	— 0.18	1.24	1.26	.02	S.	12 44 40.24	40.42	+0.18	..	17.13	..
r. 5	3 31 29.21	I.	2 24 18.88	18.89	+ 0.01	..	1.24	..	N.	13 21 9.39	13.83	+4.44	..	16.84	..
ril 3	2 0 37.14		2 47 31.89	31.77	— 0.12	1.21	1.24	.03	N.	15 16 8.39	7.32	—1.07	..	15.90	..
4	1 57 33.22		2 48 24.02	24.04	+ 0.01	..	1.18	..	..	. . . .	..	. .	..	..	..
6	1 51 26.64		2 50 9.55	9.28	— 0.27	1.09	1.14	.05		15 28 16.56	16.16	—0.40	16.53	15.84	—0.69
15	1 24 5.75		2 58 13.14	12.79	.35	1.01	1.17	.16		16 4 28.37	30.51	+2.14	15.30	15.59	+0.19
16	1 21 4.11		2 59 7.56	7.44	— 0.12	1.09	1.17	+ 0.08	N.	16 8 29.38	31.02	1.64	..	15.57	..
19	1 12 0.90	I.	3 1 52.36	52.37	+ 0.01	..	1.17	..	S.	16 20 27.07	27.43	+0.36	..	15.54	..
t. 24	16 46 17.71	I.	5 1 38.48	38.52	+ 0.04	..	1.52	..	N.	21 59 55.75	52.28	—3.47	..	19.46	..
. 9	11 22 58.90	I.	4 37 . .	4.67	. .	..	..	..	N.	+21 20 64.55	59.03	+5.52	..	22.56	..

SATURN.

MEAN TIME—WASHINGTON.			Limb observed.	RIGHT ASCENSIONS.			SEMI-DIAMETERS.			Limb observed.	DECLINATIONS.			SEMI-DIAMETER		
				Observed.	Comp.	C. — O.	Obs'd.	Comp.	C. — O.		Observed.	Comp.	C. — O.	Obs'd.	Comp.	C.
		h. m. s.		h. m. s.	s.	s.	s.	s.	s.		° ′ ″	″	″	″	″	
July	16	14 30 49.28		22 9 49.28	48.25	− 1.03	0.97	0.62	− 0.35		−12 58 31.24	44.54	−13.30	10.15	8.41	−
	29	13 36 45.77		22 6 51.87	50.33	1.54	1.02	0.62	0.40		13 17 7.25	11.44	4.19	9.81	8.44	
Aug.	4	13 11 36.68		22 5 17.98	16.48	1.50	0.73	0.62	− 0.11	N.	13 26 20.73	33.44	12.71	..	8.48	
	12	12 37 56.50	I.	22 3 4.71	3.62	1.09	..	0.63	..		. . . .	..	. .	..	..	
	14	12 29 30.24		22 2 30.17	29.46	0.72	..	0.63	..		. . . .	..	. .	..	..	
	18	12 12 37.39		22 1 21.75	20.42	1.33	..	0.63	..	N.	13 49 5.29	20.71	15.42	..	8.51	
	28	11 30 26.88		21 58 28.85	27.36	1.49	0.61	0.63	+ 0.02		14 5 16.50	25.44	8.94	10.32	8.50	
	31	11 17 47.97	II.	21 57 37.56	36.34	1.22	..	0.63	..		14 9 54.43	64.21	9.78	10.46	8.49	
Sept.	5	10 56 45.56	I.	21 56 14.42	13.31	1.11	..	0.63	..	N.	14 17 20.27	32.70	12.43	..	8.47	
	7	10 48 20.87	II.	21 55 41.46	40.99	0.47	..	0.63	..		14 20 18.30	25.38	7.08	10.59	8.46	
	8	10 44 9.91	I.	21 55 26.36	25.06	1.30	..	0.63	..	N.	14 21 39.13	50.14	11.01	..	8.45	
	25	9 33 20.28		21 51 26.47	25.19	1.28	0.63	0.62	− 0.01		14 42 21.06	28.96	7.90	9.93	8.35	−
Oct.	3	9 0 26.79	I.	21 49 60.00	58.99	1.01	..	0.61	..	N.	14 49 18.89	31.49	12.60	..	8.29	
	5	8 52 17.03		21 49 42.00	40.65	1.35	..	0.61	..	N.	14 50 48.16	58.79	10.63	..	8.28	
	9	8 36 0.79		21 49 9.30	8.10	1.20	..	0.61	..	N.	14 53 19.95	30.43	10.48	..	8.25	
	11	8 27 54.61		21 48 54.90	53.43	− 0.97	..	0.61	..	N.	−14 54 23.90	33.58	9.68	..	8.23	

URANUS.

Jan.	5	5 24 27.44	Center	0 24 58.95	66.63	+ 7.68	..	..	..	Center	+ 1 57 4.74	45.76	+41.02	..	..

NEPTUNE.

Oct.	24	7 39 23.0		21 51 30.53	30.52	− 0.01	..	..	..		−13 33 23.11	24.88	− 1.77	..	..
	25	7 35 25.5		21 51 28.71	28.90	+ 0.19	..	..	..		13 33 27.75	32.93	5.18	..	..
	29	7 19 36.7		21 51 23.92	23.69	− 0.23	..	..	..		13 33 56.59	58.47	1.88	..	..
Nov.	10	6 32 22.8		21 51 20.69	20.37	− 0.32	..	..	..		13 34 3.95	10.17	6.22	..	..
	21	5 49 21.1		21 51 33.99	34.02	+ 0.03	..	..	..		13 32 50.46	53.48	3.02	..	..
Dec.	2	5 4 36.0		21 52 3.73	3.51	− 0.22	..	..	..		−13 30 12.81	14.05	− 1.24	..	..

RESULTS OF OBSERVATIONS

WITH

THE EQUATORIAL,

1846.

NATIONAL OBSERVATORY.

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COMET OF JUNE, 1845.

DATE.	M. T. WASH.	COMET'S APPARENT		Observer.	STAR'S MEAN PLACE 1850.0.		Mag.	AUTHORITY.
		a.	δ.		a.	δ.		
	h. m. s.	h. m. s.	° ′ ″		h. m. s.	° ′ ″		
1845. June 4	15 10 58.4	4 1 52.18	+ 41 49 32.47	H.	4 2 16.77	+ 41 43 30.34	8	Bessel Z. 510.
12	9 13 32.8	6 38 59.82	43 52 44.74	H.	6 38 32.14	43 55 4.20	8	Washington Observations
13	8 41 58.7	6 44 34.59	42 56 56.59	H.	6 56 57.73	42 57 55.12	9	“ “
15	9 1 48.3	7 21 52.98	40 41 55.15	H.	7 21 39.99	40 44 45.93	.	“ “
	9 12 40.5	7 21 58.56	40 41 16.48	H.	7 20 43.50	40 39 54.30	7	“ “
17	8 54 11.5	7 43 8.93	38 16 56.09	C.	7 42 30.14	38 19 7.03	9	“ “
23	9 8 17.2	8 23 58.17	31 26 10.24	H.	8 24 43.07	31 23 19.28	7	“ “
24	9 2 10.4	8 28 31.90	30 26 29.04	C.	8 28 58.84	30 32 19.51	.	“ “
	9 19 22.1	8 28 34.81	30 25 17.45	C.	8 26 47.95	30 31 51.49	9	“ “
25	9 14 44.5	8 32 43.79	. . .	C.	8 31 44.04	29 24 37.29	9	Bessel Z. 350.
	9 14 44.5	8 32 43.60	. . .	C.	8 31 46.65	29 52 58.83	9	“
	9 14 44.5	8 32 44.03	29 28 0.30	C.	8 32 19.03	29 25 21.98	9	“
July 1	8 52 37.4	8 51 22.20	+ 24 29 27.31	C.	8 49 59.27	+ 24 32 33.16	7	Washington Observations.

ENCKE'S COMET, 1845.

DATE.	M. T. WASH.	COMET'S APPARENT a.	COMET'S APPARENT δ.	Observer.	STAR'S MEAN PLACE a.	STAR'S MEAN PLACE δ.	Mag.	AUTHORITY.
1845. July 10	15 29 34.4	5 39 14.67	+ 29 41 16.55	C.	5 39 19.87	+ 29 41 31.70	8	Washington Observations.
	15 29 34.4	5 39 14.76	29 41 18.64	C.	5 39 41.97	29 40 14.75	8.9	“ “
11	15 19 10.0	5 45 49.19	29 39 29.98	H.	5 45 54.29	29 40 8.82	9.10	“ “
	15 20 18.1	5 45 48.06	+ 29 39 26.42	H.	5 46 54.90	+ 29 43 21.58	10	“ “

BIELA'S COMET, 1846.

DATE.	M. T. WASH.	COMET'S APPARENT a.	COMET'S APPARENT δ.	Observer.	STAR'S MEAN PLACE a.	STAR'S MEAN PLACE δ.	Mag.	AUTHORITY.
1846. Jan. 12	7 40 40.8	23 52 38.13	— 0 26 27.52	M.	23 54 25.08	— 0 25 12.20	9.10	Washington Observations.
13	6 27 28.2	23 55 22.65	0 29 38.12	M.	23 54 25.08	0 25 12.20	9.10	“ “
	6 51 42.4	23 55 25.30	. . .	H.	23 54 30.13	0 24 . .	9	“ “
14	6 53 11.1	23 58 20.79	0 33 10.74	M. & C.	23 59 27.54	0 29 43.43	9.10	“ “
18	7 29 50.2	0 10 34.96	0 49 33.52	M.	0 14 10.22	0 50 12.68	7.8	“ “
19	6 37 45.1	0 13 35.92	0 53 34.98	M. & C.	0 14 10.22	0 50 12.68	7.8	“ “
	6 37 45.1	0 13 36.29	0 53 35.58	M. & C.	0 18 55.84	0 52 50.94	6	Twelve year Catalogue.
22	7 2 23.4	0 23 24.28	1 7 41.92	M.	0 22 9.90	1 9 5.39	8.9	Washington Observations.
23	7 10 23.8	0 26 44.88	1 12 34.62	M. & C.	0 25 8.31	1 16 22.34	9	“ “
	7 10 23.8	0 26 45.09	1 12 38.02	M. & C.	0 30 24.50	1 19 44.31	7	“ “
	7 13 7.2	0 26 45.31	1 12 36.15	M. & C.	0 27 50.80	1 19 48.51	7.8	“ “
24	7 8 48.2	0 30 8.44	1 17 40.76	M.	0 27 50.80	1 19 48.51	7.8	“ “
	7 22 20.2	0 30 10.66	1 18 1.18	M.	0 30 24.50	1 19 44.31	7	“ “
26	6 20 16.6	0 36 54.13	1 28 59.22	M.	0 40 39.65	1 18 27.28	7	“ “
	6 20 16.6	0 36 54.46	1 28 59.88	M.	0 43.36.26	1 21 11.00	9	“ “
	6 52 22.4	0 37 2.88	1 29 10.56	M.	0 30 24.50	1 19 44.31	7	“ “
28	6 43 54.2	0 44 8.63	1 41 34.28	M.	0 38 15.25	1 37 29.90	9	Weisse O. 664, & Wash. Obs.
	6 43 54.2	0 44 8.81	1 41 32.06	M.	0 38 53.70	1 39 23.40	9	“ O. 674, “ “
Feb. 4	7 1 51.6	1 10 52.26	2 34 56.76	W.	1 3 36.01	2 47 7.20	9	Washington Observations.
	7 1 51.6	1 10 52.70	. . .	W.	1 5 42.47	2 39 20.14	9	Weisse I. 72.
5	6 49 4.1	1 14 53.33	2 43 49.51	M.	1 14 10.51	2 47 2.57	9	Washington Observations.
9	6 48 13.2	1 31 42.18	3 25 2.67	M.	1 32 1.50	3 16 51.30	9	Weisse I. 564, & Wash. Obs.
	6 50 0.0	1 31 41.78	3 24 56.64	M.	1 33 9.86	3 22 53.31	8	“ I. 594, “ “
11	8 4 39.5	1 40 45.06	3 48 36.07	M.	1 39 56.05	3 39 35.05	8	“ I. 725.
18	7 1 53.4	2 14 2.97	5 23 51.60	M.	2 17 36.21	5 25 42.80	9	Maclear 2.*
21	7 22 46.0	2 29 55.72	6 12 0.15	M.	2 28 4.70	6 19 44.87	9	Weisse II. 475, & Wash. Obs.
	7 31 2.9	2 29 56.80	6 11 58.33	M.	2 26 39.33	6 17 49.14	8	“ II. 443, “ “
22	7 1 24.4	2 35 18.22	6 28 28.78	M.	2 32 39.02	6 19 37.70	9	“ II. 566, “ “
Mar. 3	8 46 56.3	3 30 41.53	9 15 56.11	M.	3 25 6.86	9 6 19.16	9	“ III. 455, “ “
4	8 52 37.9	3 37 44.47	9 35 19.30	M.	3 38 42.94	9 28 48.69	7.8	Maclear 10. “ “
	8 57 37.5	3 37 46.05	9 35 28.41	M.	3 38 1.56	9 30 20.15	9	Weisse III. 732, “ “
5	8 19 45.5	3 44 34.76	10 3 15.42	M.	3 47 23.51	9 57 56.06	7	“ III. 924, “ “
8	8 7 11.5	4 6 21.31	— 10 52 12.01	W.	4 6 21.84	— 10 46 17.17	7	Maclear 21, “ “

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*Astr. Nachr. No. 703.

BIELA'S COMET, 1846.—Continued.

TE.	M. T. WASH.	COMET'S APPARENT a.	COMET'S APPARENT δ.	Observer.	STAR'S MEAN PLACE 1850.0. a.	STAR'S MEAN PLACE 1850.0. δ.	Mag.	AUTHORITY.
	h. m. s.	h. m. s.	° ′ ″		h. m. s.	° ′ ″		
ar. 10	8 44 35.3	4 21 50.82	— 11 29 52.82	W.	4 21 49.14	— 11 23 24.00	7.8	Lalande 8479.
	8 49 11.9	4 21 52.64	11 30 0.22	W.	4 20 43.06	11 27 49.88	7	Maclear 24.
	8 49 11.9	4 21 52.39	11 29 57.14	W.	4 20 54.42	11 30 44.00	8.9	Lalande 8440.
14	8 14 16.6	4 51 27.01	12 38 8.49	M.	4 52 57.60	12 45 43.53	6	Maclear 30, & Wash. Obs.
17	8 48 21.8	5 19 32.09	13 22 1.12	M.	5 18 44.63	13 15 58.55	7.8	" 33, " "
21	8 23 26.7	5 54 10.67	14 5 25.04	M.	5 57 44.49	14 1 39.82	8	Weisse V. 1487, " "
	8 30 17.1	5 54 11.66	14 5 21.60	M.	5 53 25.19	14 11 14.41	8	" V. 1372, " "
	8 30 17.1	5 54 12.45	14 5 26.90	M.	5 57 22.56	14 4 58.58	7	" V. 1479, " "
	8 30 17.1	5 54 12.47	14 5 25.83	M.	5 58 3.12	14 6 50.09	8	" V. 1500, " "
	9 6 24.5	5 54 24.20	14 5 39.67	M.	5 49 34.56	14 11 55.64	4	B. A. C. 1901, " "
30	10 12 10.6	7 11 56.12	14 33 20.13	M.	7 8 17.26	14 21 7.33	7	Weisse VII. 250, " "
	10 12 10.6	7 11 57.00	14 33 9.99	M.	7 9 14.05	14 14 54.88	7	" VII. 283, " "
	10 16 32.1	7 11 57.73	14 33 12.34	M.	7 10 14.91	14 35 3.57	7	" VII. 316, " "
pr. 3	9 49 2.5	7 43 22.55	14 18 12.98	W.	7 38 35.21	14 19 46.80	7	B. A. C. 2569.
	9 49 2.5	7 43 22.44	14 17 58.99	W.	7 39 2.46	14 12 10.10	5.6	B. A. C. 2573.
15	8 45 11.7	8 1 50.62	12 41 37.59	M.	9 0 5.78	12 42 29.75	7	Weisse VIII. 1529.
19	10 24 43.5	9 23 12.35	— 12 5 6.88	W.	9 22 35.61	— 12 4 51.30	9	" IX. 488.

COMPANION OF BIELA'S COMET.

eb. 12	6 43 57.3	1 44 54.51	— 3 55 54.50	M.	1 39 27.73	— 3 51 57.98	8	Weisse I. 715, & Wash. Obs.
	6 43 57.3	1 44 53.62	3 55 52.35	M.	1 40 2.72	3 59 35.13	9	" I. 727, " "
	6 52 30.8	1 44 56.65	3 55 59.70	M.	1 45 11.05	3 51 38.36	9	" I. 813, " "
13	7 17 1.8	1 49 36.06	4 8 45.60	W.	1 52 40.63	4 5 50.45	7.8	" I. 942, " "
16	6 54 19.8	2 3 50.82	4 49 0.65	M.	1 59 29.92	4 56 2.09	8	" I. 1069, " "
	7 1 44.4	2 3 51.62	4 48 59.83	M.	2 8 23.47	4 47 35.17	8.9	" II. 120, " "
	7 1 44.4	2 3 51.86	4 49 0.65	M.	2 10 42.69	4 47 38.90	8.9	" II. 159, " "
21	7 47 59.1	2 29 48.61	. . .	M.	2 26 39.33	6 17 49.14	8	" II. 443, " "
	7 47 59.1	2 29 48.60	. . .	M.	2 28 4.70	6 19 44.87	9	" II. 475, " "
ar. 8	8 19 53.4	4 6 0.24	10 43 42.37	W.	4 6 21.84	10 46 17.17	7	Maclear 21, " "
	8 23 30.8	4 6 1.88	10 43 49.22	W.	4 7 15.73	10 37 55.34	5	B. A. C. 1303, " "
10	8 17 8.3	4 21 15.52	11 20 38.39	W.	4 21 49.14	11 23 24.00	7.8	Lalande 8479.
17	8 11 45.3	5 18 40.23	— 13 12 53.26	M.	5 18 44.63	— 13 15 58.55	7.8	Maclear 33, & Wash. Obs.

OBSERVATIONS OF RELATIVE POSITIONS OF THE TWO COMETS. (COMPANION—BIELA.)

TE.	M. T. WASH.	Δa.	Δδ.	DATE.	M. T. WASH.	Δa.	Δδ.
	h. m. s.	s.	′ ″		h. m. s.	s.	′ ″
Jan. 14	6 51 42.4	— 4.00	+ 1 9.07	Feb. 13	7 17 1.8	— 8.67	+ 4 38.43
18	7 27 57.6	4.46	1 48.16	16	7 18 55.8	9.61	5 5.45
19	6 37 45.1	4.33	1 46.32	18	7 32 55.8	9.98	5 17.91
22	7 0 46.6	5.50	1 53.60	21	7 27 30.1	11.76	5 54.50
23	7 15 14.2	5.14	2 0.79	22	7 10 38.6	12.12	6 4.53
24	7 16 13.8	5.49	2 3.94	26	7 46 24.5	14.84	6 50.06
26	6 51 19.7	5.48	2 20.73	Mar. 3	8 51 35.3	19.47	7 26.16
28	6 57 26.7	5.65	2 27.30	4	9 1 46.5	20.66	8 11.89
Feb. 4	6 30 59.3	6.25	3 10.97	5	8 30 33.6	22.50	8 7.99
5	6 59 55.7	6.53	3 22.27	8	8 14 28.2	25.25	. .
9	6 54 16.7	7.44	4 2.39	10	8 17 8.3	27.26	. .
11	7 54 17.1	7.72	4 4.60	14	8 30 11.7	32.90	9 10.94
12	7 3 40.4	— 7.99	+ 4 30.57	21	8 42 20.9	— 43.10	— 8 45.29

DE VICO'S COMET (1846 II.)

DATE.	M. T. WASH.	COMET'S APPARENT.		Observer.	STAR'S MEAN PLACE 1850.0.		Mag.	AUTHORITY.
		α.	δ.		α.	δ.		
	h. m. s.	h. m. s.	° ′ ″		h. m. s.	° ′ ″		
1846. Mar. 3	7 49 57.0	1 0 17.77	+ 11 17 33.74	M.	0 59 21.19	+ 11 16 35.10	9	Weisse O. 1052.
	7 51 43.3	1 0 16.70	11 17 47.61	M.	1 0 8.22	11 15 58.50	9	" O. 1065.
	7 51 43.3	1 0 16.96	11 17 43.39	M.	1 1 22.98	11 13 43.75	8	" I. 1.
4	7 30 21.9	1 0 2.21	12 46 43.27	M.	0 59 53.10	12 52 21.67	9	Filar Micrometer.*
5	7 7 15.1	0 59 43.43	14 14 4.73	M.	0 57 10.68	14 8 17.60	6	B. A. C. 305.
8	6 58 34.3	0 58 22.57	18 28 35.34	M.	0 58 30.16	18 36 20.49	8.9	Bessel Z. 378.
10	7 20 30.7	0 57 9.53	21 9 49.57	M	1 0 5.17	21 10 33.81	8	" Z. 200, 392.
11	7 24 18.5	0 56 27.47	22 27 15.44	M.	0 58 35.39	22 25 55.10	9	" Z. 392.
14	7 21 42.1	0 54 3.56	26 8 18.51	M.	0 49 10.99	26 11 9.89	6	" Z. 388.
17	7 16 5.1	0 51 14.34	29 33 46.85	M.	0 49 51.06	29 30 24.05	8.9	Rümker 232.
21	7 17 9.3	0 46 57.70	33 46 10.98	M.	0 47 9.01	33 42 47.83	8	Bessel Z. 439.
22	7 22 17.2	0 45 48.91	34 45 40.49	M.	0 47 33.42	34 45 28.52	8.9	" Z. 446.
30	7 59 29.5	0 35 34.87	42 2 15.86	M.	0 34 31.12	42 5 0.59	9	" Z. 443.
	8 10 8.5	0 35 34.05	42 2 36.12	M.	0 48 7.92	42 9 52.21	7	Rümker 225.
31	7 49 18.0	0 34 11.66	42 52 14.97	W.	0 34 9.17	43 6 53.63	7.8	Bessel Z. 443, 444.
Apr. 20	14 18 16.5	23 58 1.62	57 58 11.75	W.	0 1 12.07	58 19 21.60	6	B. A. C. 7.
27	12 6 33.9	23 38 37.71	62 42 1.90	W.	23 43 6.74	62 54 37.20	8	Radcliffe Observations.
	12 6 33.9	23 38 38.10	62 42 2.35	W.	23 40 51.63	62 59 3.56	8	" "
May 2	12 26 50.6	23 19 34.22	+ 66 0 59.49	W.	23 19 17.61	+ 66 5 49.93	7.8	Washington Observations.

BRORSEN'S COMET (1846 VII.)

DATE.	M. T. WASH.	COMET'S APPARENT.		Observer.	STAR'S MEAN PLACE 1850.0.		Mag.	AUTHORITY.
1846. May 25	9 39 30.0	6 55 19.46	+ 44 32 52.71	M.	6 58 16.12	+ 44 29 23.66	8	Radcliffe Observations.
27	9 34 54.0	6 58 17.03	42 49 23.31	W.	7 10 26.98	42 55 44.97	6.7	" "
	9 34 54.0	6 58 17.06	+ 42 49 23.87	W.	7 12 8.44	+ 42 56 29.61	9	" "

NEPTUNE 1846.—STARS OF COMPARISON.

	Mean α 1850.0.	Mean δ 1850.0.	AUTHORITY.
	h. m. s.	° ′ ″	
a	21 50 18.95	— 13 22 48.27	Washington Observations.
b	21 52 19.38	13 34 13.63	" "
c	21 52 0.64	— 13 25 5.60	" "

APPARENT PLACES OF NEPTUNE.

DATE.	M. T. WASH.	α.	δ.	Star.	Observer.
	h. m. s.	h. m. s.	° ′ ″		
1846. Oct. 23	8 53 0.9	21 51 32.34	— 13 33 18.99	a	M.
24	6 51 4.8	51 30.47	33 23.60	a	M.
25	7 44 36.3	51 29.06	33 32.16	a	M.
26	6 43 51.5	51 27.66	33 40.58	a	M.
	. . .	51 27.46	33 38.87	b	M.
	. . .	51 27.52	33 40.25	c	M.
28	7 26 24.3	51 24.70	33 54.32	a	M.
	. . .	51 24.96	33 51.21	b	M.
	. . .	51 25.02	33 53.25	c	M.
29	6 46 29.8	51 23.52	33 57.40	a	M.
	. . .	51 23.64	— 13 33 56.98	b	M.

*Compared with Weisse O. 1064 and 1069.

APPARENT PLACES OF NEPTUNE.

ATE.	M. T. WASH.	α.	δ.	Star.	Observer.
	h. m. s.	h. m. s.	° ′ ″		
Oct. 29	. . .	21 51 23.73	— 13 33 56.97	*c*	M.
Nov. 3	5 55 0.6	51 20.16	34 16.72	*a*	M.
	. . .	51 20.24	. .	*b*	M.
	. . .	51 20.14	. .	*c*	M.
9	6 38 24.0	51 20.08	34 15.38	*a*	M.
	. . .	51 20.24	34 12.00	*b*	M.
	. . .	51 20.14	34 10.55	*c*	M.
16	6 44 35.9	51 25.81	33 37.93	*a*	M.
	. . .	51 26.00	33 37.34	*b*	M.
20	7 51 18.5	. .	33 2.79	*a*	M.
	. . .	51 32.02	33 0.11	*b*	M.
21	6 22 16.6	51 34.13	32 52.48	*a*	M.
	. . .	. .	32 52.96	*b*	M.
28	7 5 13.2	51 51.39	31 21.60	*a*	W.
29	6 56 59.5	51 54.22	31 4.90	*a*	W.
	. . .	. .	31 3.10	*c*	W.
Dec. 3	5 57 1.6	52 7.02	29 52.49	*a*	W.
	. . .	52 6.83	. .	*c*	W.
9	6 4 12.9	52 30.73	. .	*a*	W.
	. . .	52 30.54	27 48.74	*c*	W.
12	6 38 21.1	52 43.83	26 37.94	*a*	W.
	. . .	52 44.18	26 37.19	*c*	W.
13	7 10 27.6	52 48.79	26 11.58	*a*	W.
	. . .	52 48.72	26 10.21	*c*	W.
15	7 47 57.8	52 58.88	25 19.76	*a*	W.
	. . .	52 58.64	25 18.37	*c*	W.
19	6 32 57.5	53 18.99	23 29.79	*a*	W.
	. . .	53 18.95	23 30.21	*c*	W.
20	6 23 50.9	53 24.49	23 0.96	*a*	W.
	. . .	53 24.49	23 0.13	*c*	W.
23	6 34 37.0	53 41.80	21 29.96	*a*	W.
	. . .	53 41.54	. .	*c*	W.
26	6 16 8.5	53 59.56	19 56.03	*a*	W.
	. . .	53 59.44	. .	*c*	W.
30	6 38 25.8	21 54 24.54	— 13 17 41.85	*a*	H.

CATALOGUE OF STARS

OBSERVED IN 1846.

NATIONAL OBSERVATORY.

		NAME.	Inst.	RIGHT ASCENSION. 1850.0.		No. of Obs.	Inst.	DECLINATION. 1850.0.		No. o Obs.
				h. m. s.	s.			° ′ ″	″	
	α	Andromedæ	T.	0 0 38.57	± 0.021	16	M.	+ 28 15 43.75	± 0.13	12
			C.	38.56	± 0.020	25	C.	44.65	± 0.19	25
.			P.	38.67	± 0.047	9	P.	44.66	± 0.09	9
		Anonymous	P.	5 3.35	..	1	P.	+ 36 51 34.00	. .	1
	γ	Pegasi	T.	5 30.98	± 0.017	18	M.	+ 14 20 57.13	± 0.20	7
			C.	31.00	± 0.020	13	C.	58.66	± 0.30	11
4	ϑ	Andromedæ	T.	9 15.87	..	1	..	. . . .	. .	..
.			P.	16.22	..	3	P.	+ 37 50 54.78	. .	3
5		Piscium (66)	T.	12 52.93	..	1	..	+ 7 21 26.8	. .	..
6	ρ	Andromedæ	P.	13 14.22	..	2	P.	+ 37 8 14.53	. .	2
7		Weisse O. 246	T.	14 10.22	..		M.	— 0 50 12.68	. .	4
8		Weisse O. 368	T.	22 9.96	..	3	M.	— 1 9 5.51	. .	4
.			C.	9.72	..	1	C.	4.89	. .	1
9		Anonymous	T.	22 52.18	..	1	..	— 1 12 ..	. .	1
		Bessel's Zone, 387	P.	24 42.65	..	1	P.	+ 38 0 57.84	. .	1
		Weisse O. 425	T.	25 8.81	..	3	M.	— 1 16 22.34	. .	2
		Bessel's Zone, 386	P.	27 9.02	..	1	P.	+ 36 0 21.20	. .	1
		Weisse O. 479	T.	27 50.84	..	3	M.	— 1 19 49.44	. .	2
			C.	50.70	..	1	C.	46.65	. .	1
		Ceti (163)	T.	30 24.52	± 0.038	5	M.	+ 1 19 45.07	. .	2
			C.	24.43	..	1	C.	42.78	. .	1
	δ	Andromedæ	T.	31 19.11	..	1	..	+ 30 2 19.7	. .	..
	α	Cassiopeæ	T.	32 1.45	± 0.032	15	M.	+ 55 42 50.45	± 0.16	13
		S. P.	..	. . .	..	..	M.	44.85	± 0.47	6
.			C.	1.57	± 0.033	12	C.	50.37	± 0.44	11
		S. P.	C.	1.33	..	3	C.	45.42	. .	3
	β	Ceti	T.	36 3.51	± 0.033	7	..	. . . .	. .	..
			C.	3.37	± 0.026	13	C.	— 18 48 38.69	± 0.36	10
		Weisse O. 664	T.	38 15.25	..	1	..	— 1 39 ..	. .	..
19		Weisse O. 674	T.	38 53.70	..	2	..	— 1 41 ..	. .	..
20		Weisse O. 712	T.	40 39.65	..	1	M.	— 1 18 27.70	. .	2
..			C.	39.65	..	1	C.	26.44	. .	1
21	δ	Piscium	T.	40 54.18	..	1	..	+ 6 46 5.6	. .	..
22		Weisse O. 762	T.	43 36.26	..	1	..	— 1 22 ..	. .	..
23		Weisse O. 772	..	43 57.	..	..	M.	— 1 18 13.41	. .	1
24		Bessel's Zone, 446	P.	45 14.85	..	2	P.	+ 36 36 15.55	. .	2
25	μ	Andromedæ	P.	48 26.60	..	4	P.	+ 37 41 4.51	. .	4
26	η	Andromedæ	T.	49 12.48	..	1	..	+ 22 36 27.9	. .	..
27	ε	Piscium	T.	55 9.70	..	1	..	+ 7 4 53.0	. .	..
28		Bessel's Zone, 446	P.	0 58 59.35	..	1	P.	+ 37 13 31.92	. .	1
29		Piscium (328)	T.	1 0 39.04	..	1	..	+ 4 51 17.3	. .	..
30	β	Andromedæ	P.	1 20.81	..	2	..	+ 34 49 26.9	. .	..
31		Weisse I. 40	T.	3 36.01	..	1	M.	— 2 47 5.40	. .	2
32		Polaris	T.	5 1.07	± 0.146	87	M.	+ 88 30 34.92	± 0.07	79
..		S. P.	..	. . .	..	..	M.	34.97	± 0.06	..
..			C.	1.25	± 0.135	21	C.	34.62	± 0.15	19
..		S. P.	C.	1.53	± 0.108	40	C.	35.80	± 0.15	41
33		Weisse I. 72	..	5 42.	..	..	M.	— 2 39 19.00	. .	1
34		Anonymous	P.	8 43.88	..	1	P.	+ 38 41 15.06	. .	1
35		Anonymous	P.	8 52.65	..	1	P.	+ 36 37 34.64	. .	1
36		Bessel's Zone, 446	P.	10 17.96	..	2	P.	+ 36 35 43.67	. .	2
37		Bessel's Zone, 136	T.	14 0.51	..	1	..	— 2 48 ..	. .	..
38		Weisse I. 225	..	14 10.	..	..	M.	— 2 47 1.63	. .	2
39		Weisse I. 227	T.	14 32.49	..	1	..	— 2 42 ..	. .	..
40	ϑ^1	Ceti	T.	16 31.61	± 0.015	13	M.	— 8 57 31.26	. .	1
..			C.	31.90	± 0.071	2	C.	32.24	± 0.23	2
41		Weisse I. 564	..	32 1.	..	..	M.	— 3 16 51.38	. .	2
42		Weisse I. 694	..	33 10.	..	..	M.	— 3 22 53.36	. .	3

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		h. m. s.	s.			° ′ ″	″	
Andromedæ (516)	P.	1 33 24.32	..	1	P.	+ 34 29 12.25	. .	1
ν Piscium	T.	33 37.71	..	1	..	+ 4 43 35.	. .	1
Weisse I. 715	..	39 28.	..	..	M.	— 3 51 58.28	. .	2
Andromedæ (544)	P.	39 48.71	± 0.097	5	P.	+ 37 12 13.99	± 0.09	5
Weisse I. 727	..	40 3.	..	..	M.	— 3 59 33.87	. .	1
ε Cassiopeæ	T.	43 39.51	..	4	..	+ 62 55 43.	. .	.
Bessel's Zone, 446	P.	44 21.39	..	1	P.	+ 36 34 50.89	. .	1
Weisse I. 813	..	45 11.	..	..	M.	— 3 51 39.48	. .	1
Andromedæ (579)	P.	47 3.00	..	3	P.	+ 36 32 23.68	. .	3
Andromedæ (580)	P.	47 15.60	..	3	P.	+ 36 30 49.08	. .	3
Weisse I. 942	..	52 40.	..	..	M.	— 4 5 50.63	. .	2
α Arietis	T.	58 43.63	± 0.036	8	M.	+ 22 25 2.53	± 0.32	6
	C.	43.69	± 0.028	10	C.	2.96	± 0.30	8
Andromedæ	P.	1 59 26.83	..	1	P.	+ 37 8 43.11	. .	1
β Trianguli	P.	2 0 37.99	..	4	P.	+ 34 16 31.54	. .	4
Andromedæ (661)	T.	1 47.79	..	2	..	. . . . .	. .	.
	P.	47.96	..	4	P.	+ 38 19 43.54	. .	4
Andromedæ (662)	P.	1 48.59	..	4	P.	+ 38 19 57.59	. .	4
Bessel's Zone, 527	P.	6 11.12	..	1	P.	+ 38 28 1.58	. .	1
Weisse II. 120	..	8 23.	..	..	M.	— 4 47 35.66	. .	1
Weisse II. 159	..	10 43.	..	..	M.	— 4 47 39.30	. .	1
Anonymous	P.	13 45.81	..	1	P.	+ 37 2 0.10	. .	1
Arietis (741)	T.	16 29.86	..	1	..	+ 9 1 57.	. .	.
Cassiopeæ (744)	T.	16 46.68	± 0.048	6	..	+ 66 43 26.	. .	.
Anonymous	P.	19 57.08	..	1	P.	+ 36 39 23.17	. .	1
Anonymous	P.	20 56.37	..	2	P.	+ 38 16 56.78	. .	2
Anonymous	P.	21 42.21	..	1	P.	+ 36 34 2.78	. .	1
Bessel's Zone, 527	P.	22 35.67	..	2	P.	+ 37 27 15.61	. .	2
Trianguli (772)	P.	22 57.73	..	3	P.	+ 35 28 43.93	. .	3
Anonymous	P.	23 21.98	..	1	P.	+ 38 52 29.92	. .	1
Bessel's Zone, 446	P.	26 25.42	..	3	P.	+ 36 39 9.14	. .	3
Weisse II. 442	..	26 39.	..	..	M.	— 6 17 53.87	. .	1
Weisse II. 443	..	26 39.	..	..	M.	— 6 17 48.51	. .	1
Weisse II. 475	..	28 5.	..	..	M.	— 6 19 45.75	. .	1
Bessel's Zone, 527	P.	29 2.24	..	1	P.	+ 37 4 27.93	. .	1
Weisse II. 566	..	32 39.	..	..	M.	— 6 19 37.97	. .	1
γ Ceti	T.	35 31.96	± 0.016	14	M.	+ 2 36 4.01	± 0.13	11
Ref.	..	. . .	..	..	M.	3.66	. .	2
	C.	31.96	± 0.016	14	C.	3.13	± 0.34	13
Bessel's Zone, 508	P.	37 42.92	..	1	P.	+ 35 20 58.31	. .	1
Persei (871)	..	. . .	..	..	M.	+ 37 41 52.50	. .	1
	P.	41 7.65	± 0.048	7	P.	51.18	± 0.11	7
Anonymous	P.	48 33.04	..	3	P.	+ 38 0 29.50	. .	3
α Ceti	T.	54 26.55	± 0.021	12	M.	+ 3 29 54.01	± 0.32	6
Ref.	..	. . .	..	..	..	53.35	. .	2
	C.	26.61	± 0.015	11	C.	53.04	± 0.08	13
ρ Persei	T.	55 34.57	..	1	M.	+ 38 15 20.70	. .	1
	P.	34.24	..	4	P.	19.80	. .	4
β Persei	T.	2 58 25.61	..	2	..	+ 40 22 25.	. .	..
Bessel's Zone, 448	P.	3 8 2.36	..	2	P.	+ 38 43 40.60	. .	2
α Persei	T.	13 38.31	± 0.025	15	M.	+ 49 19 21.76	± 0.12	11
	..	. . .	..	..	M.	23.32	. .	2
	C.	38.39	± 0.026	17	C.	20.94	± 0.21	18
Bessel's Zone, 448	P.	25 18.68	..	1	P.	+ 38 4 45.44	. .	1
Weisse III. 569	..	30 57.	..	..	M.	+ 13 24 9.51	. .	1
Bessel's Zone, 448	P.	3 30 57.54	..	3	P.	+ 38 37 55.78	. .	3

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				h. m. s.	s.			° ′ ″	″	
89		Bessel's Zone, 448 . . .	P.	3 30 58.30	..	3	P.	+ 38 37 37.13	..	3
90		Persei (1123)	P.	31 22.79	..	2	P.	+ 37 5 28.81	..	2
91		Bessel's Zone, 448 . . .	P.	34 9.49	..	4	P.	+ 37 53 32.62	..	4
92		Anonymous	..	34 18.	..	..	M.	+ 13 19 2.04	..	1
93	o	Persei	P.	34 55.48	..	1	P.	+ 31 48 30.94	..	1
94		Tauri (1161)	T.	37 25.77	..	1	..	+ 23 28 38.	..	..
95		Tauri (1164)	..	38 26.	..	..	M.	+ 23 38 52.68	..	2
96	η	Tauri	T.	38 34.52	..	..	M.	+ 23 38 13.55	± 0.23	6
..		. . . .	C.	34.63	± 0.014	15	C.	14.60	± 0.29	17
97		Bessel's Zone, 448 . . .	P.	40 12.67	..	1	P.	+ 37 24 44.58	..	1
98		Tauri (1176)	T.	40 15.07	..	4	..	+ 23 35 27.	..	..
99		Tauri (1177)	T.	40 16.40	..	1	..	+ 23 40 29.	..	..
100		Bessel's Zone, 448 . . .	P.	44 9.80	..	2	P.	+ 38 5 49.73	..	2
101		Weisse III. 878	..	45 22.	..	..	M.	+ 14 44 7.58	..	2
102	ξ	Persei	P.	49 14.63	± 0.071	5	P.	+ 35 21 17.95	± 0.14	5
103		Anonymous	..	50 9.	..	..	M.	+ 14 39 11.37	..	1
104	γ¹	Eridani	T.	51 2.00	± 0.020	8	M.	— 13 56 17.73	± 0.12	8
...		. . . .	C.	1.91	± 0.019	13	C.	19.74	± 0.36	13
105	A¹	Tauri	T.	55 50.46	..	1	..	+ 21 40 4.	..	..
106		Persei (1269)	P.	58 37.39	..	1	P.	+ 37 38 33.13	..	1
107		Rümker, 1089	..	3 59 13.	..	..	M.	+ 14 45 27.13	..	
108		Weisse IV. 24	..	4 2 13.	..	..	M.	+ 14 50 20.38	..	
109		Rümker, 1110	..	3 55.	..	..	M.	+ 16 53 14.88	..	
110		Tauri (1332)	..	12 7.	..	..	M.	+ 14 43 47.32	..	
111		Weisse IV. 286	..	14 14.	..	..	M.	+ 14 41 54.96	..	
112		Anonymous	..	19 51.	..	..	M.	+ 14 45 58.43	..	
113		Tauri (1395)	..	4 22 37.	..	..	M.	+ 14 46 32.36	..	
114		Weisse IV. 533	..	25 27.	..	..	M.	+ 14 50 35.21	..	
115	α	Tauri	T.	27 19.02	± 0.023	11	M.	+ 16 12 12.52	± 0.18	
...		Ref.	..	. . .	..	..	M.	11.01	..	
...		. . . . . .	C.	19.10	± 0.016	19	C.	11.95	..	2
116	ι⁷	Eridani	T.	29 43.20	..	2	..	— 30 52 23.	..	
117		Bessel's Zone, 448 . . .	P.	31 38.90	..	2	P.	+ 37 59 15.72	..	
118		Anonymous	P.	32 38.65	..	1	P.	+ 38 8 1.13	..	
119		Aurigæ (1476)	P.	39 49.10	..	3	P.	+ 37 13 4.25	..	
120	ι	Aurigæ	T.	47 13.89	..	1	..	+ 32 55 23.	..	
121		Aurigæ (1530)	P.	49 4.68	..	4	P.	+ 37 39 28.62	..	
122		Anonymous	P.	51 26.97	..	1	P.	+ 38 33 38.81	..	
123	ι	Tauri	T.	4 54 7.99	..	1	..	+ 21 22 15.	..	
124		Anonymous	..	5 0 5.	..	..	M.	+ 29 35 28.45	..	
125		Bessel's Zone, 513 . . .	..	. . .	..	..	M.	+ 29 36 0.46	..	
...		. . .	C.	0 10.96	..	1	C.	3.50	..	
126		Orionis (1591)	T.	1 6.70	..	1	..	+ 15 24 3.	..	
127		Bessel's Zone, 513 . . .	..	2 6.	..	..	M.	+ 29 42 48.14	..	
128	μ	Aurigæ	P.	3 9.63	..	3	P.	+ 38 18 3.78	..	
129	α	Aurigæ	T.	5 36.91	± 0.025	13	M.	+ 45 50 21.42	± 0.14	
...		. . . .	C.	37.02	± 0.028	17	C.	20.58	± 0.25	
130	β	Orionis	T.	7 19.83	..	4	M.	— 8 22 43.85	..	
...		. . . . . .	C.	19.78	± 0.036	9	C.	44.31	± 0.26	
131		Anonymous	P.	12 22.31	..		P.	+ 37 31 20.48	..	
132		Bessel's Zone, 515 . . .	P.	15 23.11	..	2	P.	+ 37 54 8.36	..	
133	β	Tauri	T.	16 48.78	± 0.021	14	M.	+ 28 28 31.58	± 0.12	1
...		Ref.	..	. . .	..	..	M.	32.25	..	
...		. . . . . .	C.	16 48.89	± 0.013	17	C.	31.34	± 0.35	1
...		. . . . . .	P.	48.62	..	2	P.	30.27	..	
134	γ	Orionis	T.	5 17 5.26	..	2	..	+ 6 12 34.	..	

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		1850.0.				1850.0.		
		h. m. s.	s.			° ′ ″	″	
Tauri (1695)	T.	5 18 37.80	..	1	..	+ 21 48 16.	..	..
Groombridge, 980	P.	21 9.16	..	1	P.	+ 38 11 57.90	..	1
δ Orionis	T.	24 20.72	± 0.016	10	M.	— 0 24 52.55	± 0.28	7
. . . .	C.	20.70	± 0.013	17	C.	52.57	± 0.34	17
α Leporis	T.	26 6.90	± 0.024	7	M.	— 17 55 58.31	..	1
. . . .	C.	6.98	± 0.023	8	C.	56 2.05	± 0.31	6
ε Orionis	T.	28 36.25	± 0.013	11	M.	— 1 18 6.31	..	2
. . . .	C.	36.22	± 0.010	10	C.	8.00	± 0.51	5
ζ Tauri	T.	28 40.96	..	2	..	+ 21 2 47.	..	..
Groombridge, 1011	P.	32 28.46	..	1	P.	+ 38 7 25.23	..	1
Bessel's Zone, 513	..	. . .	..	1	M.	+ 29 46 14.24	± 0.33	4
. . .	C.	32 54.17	± 0.013	2	C.	17.86	± 0.62	2
ζ Orionis	T.	33 11.42	..	3	..	— 2 1 35.	..	..
α Columbæ	T.	34 13.13	± 0.017	9	M.	— 34 9 25.47	± 0.21	8
. . . .	C.	13.10	± 0.017	15	C.	27.01	± 0.29	14
Bessel's Zone, 515	P.	38 59.26	..	3	P.	+ 38 40 56.95	..	3
Bessel's Zone, 515	P.	39 19.60	..	2	P.	+ 38 38 29.35	..	2
Bessel's Zone, 513	..	39 20.	..	..	M.	+ 29 41 31.78	..	1
Bessel's Zone, 513	..	39 41.	..	..	M.	+ 29 40 14.75	..	3
κ Orionis	T.	40 38.65	..	3	M.	— 9 43 36.81	..	3
. . . .	C.	38.56	..	2	C.	37.48	..	2
α Orionis	T.	47 3.11	± 0.015	17	M.	+ 7 22 29.07	± 0.17	12
. . . .	C.	3.14	± 0.016	15	C.	27.06	± 0.37	14
δ Aurigæ	T.	47 10.33	..	1	..	+ 54 15 58.	..	..
β Aurigæ	T.	48 31.40	..	1	..	+ 44 55 32.	..	..
ϑ Aurigæ	P.	49 29.24	..	1	P.	+ 37 11 46.91	..	1
Aurigæ (1935)	P.	54 45.34	..	3	P.	+ 37 57 52.19	..	3
ν Orionis	T.	5 59 0.50	..	2	..	+ 14 46 52.	..	..
κ Aurigæ	T.	6 5 49.29	..	1	M.	+ 29 32 53.07	± 0.22	5
. . . .	C.	49.29	..	3	C.	53.74	..	3
μ¹ Geminorum	T.	13 53.11	± 0.012	7	M.	+ 22 35 7.13	..	4
. . . . .	C.	53.20	..	3	C.	6.75	..	3
Groombridge, 1183	P.	24 1.14	..	3	P.	+ 38 10 57.63	..	3
Aurigæ (2139)	P.	26 13.46	..	3	P.	+ 38 33 38.57	..	3
51 (Hev.) Cephei	T.	28 34.20	..	3	M.	+ 87 15 22.19	..	1
S. P.	..	. . .	..	..	M.	21.14	..	2
. . . .	C.	34.71	..	2	C.	19.68	..	2
S. P.	C.	31.98	..	1	C.	. . . . .	..	..
γ Geminorum	T.	29 2.80	..	2	..	+ 16 31 23.	..	..
Aurigæ (2182)	..	. . .	..	..	M.	+ 44 39 45.43	..	2
. . . .	C.	32 10.04	..	2	C.	45.51	..	2
Bessel's Zone, 511	..	33 48.	..	..	M.	+ 44 38 56.49	..	2
ε Geminorum	T.	34 42.16	..	..	..	+ 25 16 27.	..	..
Aurigæ (2200)	..	35 55.	..	..	M.	+ 43 43 15.04	..	1
Anonymous	..	35 56.	..	..	M.	+ 43 44 3.58	..	1
Anonymous	P.	37 4.03	..	..	P.	+ 38 41 28.24	..	1
Bessel's Zone, 511	..	37 57.	..	..	M.	+ 43 59 35.28	..	2
Bessel's Zone, 511	C.	38 32.14	..	3	M.	+ 43 55 14.11	..	4
. . .	..	. . .	..	..	C.	14.25	..	3
α Canis Majoris	T.	38 32.38	± 0.010	22	M.	— 16 30 49.52	..	4
. . . .	C.	32.42	± 0.031	10	C.	50.28	± 0.57	10
Bessel's Zone, 511	..	41 0.	..	..	M.	+ 43 50 19.95	..	2
Aurigæ (2239)	P.	42 55.05	..	3	P.	+ 38 37 10.47	..	3
Aurigæ (2241)	P.	43 39.37	..	2	P.	+ 38 40 59.44	..	2
Groombridge, 1241	P.	45 17.66	..	3	P.	+ 38 5 57.80	..	3
ε Canis Majoris	T.	52 43.91	± 0.022	8	M.	+ 28 46 16.68	..	4
. . . .	C.	43.83	± 0.026	12	C.	18.64	± 0.32	12
ζ Geminorum	T.	6 55 12.66	..	..	..	+ 20 47 7.	..	..

No.	NAME.	Inst.	RIGHT ASCENSION. 1850.0.		No. of Obs.	Inst.	DECLINATION. 1850.0.		No. of Obs.
			h. m. s.	s.			° ′ ″	″	
177	Bessel's Zone, 516	..	6 56 16.	..	..	M.	+ 43 5 25.83	..	2
178	Bessel's Zone, 511	..	. . .	..	..	M.	+ 42 57 55.53	..	1
...		C.	56 57.73	..	1	C.	54.65	..	1
179	Anonymous	T.	6 57 35.78	..	1	..	+ 42 58	..	..
180	δ Canis Majoris	T.	7 2 17.55	..	1	..	− 26 9 29.	..	..
181	Anonymous	C.	6 29.30	..	1	C.	+ 41 51 24.31	..	1
182	Anonymous	..	7 34.	..	..	M.	+ 41 48 55.92	..	1
183	Anonymous	P.	7 47.57	± 0.123	5	P.	+ 38 37 33.68	± 0.09	5
184	Anonymous	..	11 2.	..	..	M.	+ 41 37 51.14	..	1
185	Anonymous	..	11 5.	..	..	M.	+ 41 57 9.95	..	1
186	δ Geminorum	T.	11 9.63	± 0.022	11	M.	+ 22 15 13.27	..	4
...		C.	9.77	± 0.021	7	C.	12.89	± 0.25	7
187	Bessel's Zone, 492	..	11 30.	..	..	M.	+ 41 35 15.68	..	3
188	Aurigæ (2416)	P.	12 0.82	..	2	P.	+ 37 2 14.17	..	2
189	Bessel's Zone, 492	..	13 0.	..	..	M.	+ 41 38 38.51	..	4
190	Anonymous	C.	14 3.03	..	2	C.	+ 45 7 16.76	..	1
191	Lalande 14473	..	19 50.	..	..	M.	+ 41 9 2.59	..	1
192	Bessel's Zone, 452	..	20 41.	..	..	M.	+ 40 38 54.55	..	1
193	Bessel's Zone, 492	..	21 17.	..	..	M.	+ 41 46 27.68	..	1
194	Anonymous	T.	21 19.03	..	1	..	+ 41 40	..	..
195	Bessel's Zone, 452	C.	21 35.21	..	1	C.	+ 40 44 45.93	..	1
196	Bessel's Zone, 492	..	23 20.	..	..	M.	+ 41 29 18.71	..	1
197	Bessel's Zone, 452	..	24 56.	..	..	M.	+ 40 48 34.34	..	1
198	Bessel's Zone, 492	..	. . .	..	..	M.	+ 41 47 13.89	..	1
...		C.	24 58.65	..	..	C.	6.75	..	1
199	α¹ Geminorum	T.	25 0.83	..	4	M.	+ 32 13 41.09	..	1
200	α² Geminorum	T.	25 1.26	± 0.012	21	M.	+ 32 13 44.43	..	3
...		C.	1.48	± 0.025	10	C.	43.52	± 0.27	11
...		P.	0.75	..	4	P.	43.55	..	4
201	Geminorum (2486)	T.	25 2.56	..	2	..	+ 16 8 45.	..	..
202	Bessel's Zone, 452	..	27 0.	..	..	M.	+ 41 10 18.75	..	1
203	Bessel's Zone, 452	..	27 1.	..	..	M.	+ 41 6 44.63	..	1
204	Groombridge, 1343	P.	27 59.97	..	3	P.	+ 38 35 22.95	..	3
205	Groombridge, 1352	P.	30 7.37	..	1	P.	+ 38 40 55.94	..	1
206	Geminorum (2519)	T.	30 48.59	..	1	..	+ 18 0 42.	..	..
207	α Canis Minoris	T.	31 26.78	± 0.012	18	M.	+ 5 36 21.01	± 0.28	6
...		C.	26.88	± 0.027	9	C.	20.79	± 0.21	9
208	Anonymous	T.	31 34.71	..	1	..	+ 65 21	..	..
209	χ Geminorum	T.	35 23.13	..	1	..	+ 24 45 12.	..	..
210	β Geminorum	T.	36 7.74	± 0.010	13	M.	+ 28 23 1.24	..	3
...		C.	7.90	± 0.028	9	C.	0.97	± 0.41	10
...		P.	7.93	..	1	P.	2.71	..	1
211	Anonymous	..	41 1.	..	..	M.	+ 38 12 9.06	..	1
212	Anonymous	..	41 42.	..	..	M.	+ 38 10 43.22	..	2
213	Anonymous	..	. . .	..	..	M.	+ 38 19 7.80	..	3
...		C.	42 30.22	..	..	C.	5.92	..	2
214	Anonymous	..	7 44 51.	..	..	M.	+ 38 13 54.05	..	3
215	15 Argus	T.	8 1 9.42	± 0.018	7	M.	− 23 52 29.70	± 0.19	9
...		C.	9.39	± 0.031	10	C.	30.96	± 0.46	11
216	Cancri (2836)	T.	20 14.82	..	2	..	+ 14 42 8.	..	..
217	ϑ Cancri	T.	23 2.18	..	2	..	+ 18 35 53.	..	..
218	Bessel's Zone, 401	..	. . .	..	..	M.	+ 31 23 19.00	..	2
...		C.	24 43.07	..	1	..	19.73	..	1
219	Bessel's Zone, 350	..	8 26 46.	..	..	M.	+ 30 31 51.44	..	3
220	π Ursæ Majoris	T.	27 2.63	..	..	..	+ 64 50 44.	..	..
221	Hydræ (2889)	C.	27 52.16	..	1	C.	+ 7 9 5.56	..	1

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Anonymous	..	8 28 56.	..	..	M.	+ 30 32 19.46	..	1
Hydræ (2929)	C.	32 55.51	..	1	..	− 21 36 55.	..	..
δ Cancri	T.	36 9.17	..	3	..	+ 18 42 8.	..	..
ε Hydræ	T. C.	38 49.77 49.81	± 0.027 ± 0.021	9 12	M. C.	+ 6 57 57.42 57.55	± 0.11 ± 0.29	5 12
Cancri (3015)	T.	44 44.46	..	1	..	+ 17 55 53.	..	..
ι Ursæ Majoris	T. C.	48 54.72 54.82	± 0.031 ± 0.029	8 8	M. C.	+ 48 37 36.78 34.40	± 0.22 ± 0.29	5 10
ρ Ursæ Majoris	..	48 56.	..	..	M.	+ 68 12 30.55	..	1
Bessel's Zone, 344	..	49 48.	..	..	M.	+ 24 32 33.55	..	3
Bessel's Zone, 344, 345	C.	49 59.23	..	2	C.	+ 24 32 32.52	..	2
Anonymous	T.	50 13.47	..	1	..	+ 53 15	..	..
α Cancri	T.	50 16.69	..	3	..	+ 12 26 8.	..	..
Bessel's Zone, 493	P.	53 55.24	..	1	P.	+ 38 26 7.35	..	1
σ^2 Ursæ Majoris	T.	57 6.98	..	1	..	+ 67 44 17.	..	..
ω Hydræ	T.	58 4.49	..	1	..	+ 5 41 18.	..	..
κ Cancri	T.	8 59 37.09	..	4	..	+ 11 16 11.	..	..
Weisse VIII. 1529	.. C.	. . . . 9 0 5.42	.. ..	.. 1	M. C.	− 12 42 27.78 27.82	.. ..	1 1
Cancri (3115)	C.	0 37.26	..	1	C.	+ 18 4 27.57	..	1
Hydræ (3124)	C.	2 15.59	..	1	..	+ 8 10 49.	..	..
Cancri (3138)	T.	5 2.82	..	1	..	+ 21 53 57.	..	..
Lyncis (3162)	P.	9 29.73	..	3	P.	+ 37 26 3.20	..	3
Hydræ (3188)	T.	13 9.67	..	1	..	− 8 55 17.	..	..
Draconis (3199)	T.	15 15.77	..	1	..	+ 81 58 53.	..	..
α Hydræ	T. C.	20 12.90 12.97	± 0.010 ± 0.021	12 13	M. C.	− 8 0 38.11 39.44	± 0.28 ± 0.28	8 11
ϑ Ursæ Majoris	T. C.	22 47.42 47.61	.. ..	4 1	M. C.	+ 52 21 28.81 22.61	.. ..	1 1
ξ Leonis	T.	23 51.29	..	4	..	+ 11 57 44.	..	..
Leonis Minoris (3252)	P.	24 17.27	..	1	P.	+ 37 8 56.75	..	1
Leonis Minoris (3261)	P.	21 1.62	..	1	P.	+ 37 3 38.68	..	..
Sextantis (3295)	T.	30 37.73	..	1	..	+ 5 19 26.	..	..
ο Leonis	T.	33 8.49	..	4	..	+ 10 34 19.	..	..
ε Leonis	T. C.	37 19.68 19.77	± 0.018 ± 0.014	12 12	M. C.	+ 24 27 45.24 44.46	± 0.07 ± 0.21	6 12
Bessel's Zone, 407	P.	40 22.92	..	3	P.	+ 37 26 33.40	..	3
Leonis Minoris (3364)	P.	43 14.28	..	2	P.	+ 38 36 56.22	..	2
μ Leonis	T.	44 13.42	..	2	..	+ 26 42 40.	..	..
Bessel's Zone, 407	P.	45 47.53	..	2	P.	+ 38 7 13.52	..	2
ν Leonis	T.	50 8.99	..	1	..	+ 13 9 30.	..	..
π Leonis	T.	52 16.61	..	2	..	+ 8 45 53.	..	..
Anonymous	T.	52 21.54	..	1	..	+ 7 25	..	..
Bessel's Zone, 407	P.	54 53.00	..	2	P.	+ 38 44 53.56	..	2
Leonis Minoris (3446)	P.	9 58 34.01	..	2	P.	+ 35 58 25.00	..	2
α Leonis	T. C.	10 0 22.66 22.75	± 0.018 ± 0.019	14 23	M. C.	+ 12 41 54.70 54.82	± 0.13 ± 0.30	9 15
Bessel's Zone, 407	P.	2 18.54	..	2	P.	+ 38 8 19.57	..	2
Bessel's Zone, 407	P.	3 9.58	..	2	P.	+ 36 59 16.51	..	2
Sextantis (3492)	C.	6 39.85	..	1	C.	− 7 15 9.09	..	1
λ Ursæ Majoris	T.	8 1.77	..	3	..	+ 43 39 41.	..	..
Bessel's Zone, 407	P.	9 31.54	..	2	P.	+ 38 15 23.42	..	2
μ Hydræ	T.	18 50.26	..	1	..	− 16 4 19.	..	..
β Leonis Minoris	P.	19 11.09	..	3	P.	+ 37 28 27.47	..	3
α Antliæ	C.	10 20 17.56	..	1	C.	− 30 17 24.32	..	1

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270	Anonymous	P.	10 21 53.98	..	1	P.	+ 37 48 6.11	..	1
271	ρ Leonis	T.	24 54.50	..	3	..	+ 10 4 35.	..	..
272	Leonis Minoris (3640)	C.	30 16.03	..	1	..	+ 32 45 14.	..	..
273	ϕ^3 Hydræ	T.	31 16.36	..	1	..	— 16 5 56.	..	..
274	Canis Minoris (3685)	T.	37 30.69	..	1	..	+ 31 28 18.	..	..
275	Bessel's Zone, 411	P.	39 51.59	..	3	P.	+ 38 21 37.11	..	3
276	Leonis Minoris (3728)	C.	44 54.75	..	1	C.	+ 35 1 21.41	..	1
277	Bessel's Zone, 411	P.	46 19.75	..	1	P.	+ 37 33 28.34	..	1
278	Leonis (3742)	T.	47 28.72	..	1	..	+ 25 32 56.	..	..
279	Leonis (3768)	T.	52 48.69	..	1	..	+ 4 25 17.	..	..
280	α Ursæ Majoris	T.	54 25.52	± 0.033	9	M.	+ 62 33 35.18	± 0.12	9
..		C.	25.60	± 0.017	15	C.	33.55	± 0.32	15
281	α Ursæ Majoris, (S. P.)	..	. . .	..	..	M.	34.09	± 0.28	8
..		C.	25.57	..	1	C.	32.71	..	2
282	Bessel's Zone, 499	P.	10 55 8.33	..	1	P.	+ 36 58 43.99	..	1
283	Bessel's Zone, 411	P.	11 1 2.82	..	2	P.	+ 37 7 19.67	..	2
284	Bessel's Zone, 358	P.	4 21.57	..	3	P.	+ 36 36 6.09	..	3
285	Bessel's Zone, 358	P.	4 31.13	..	2	P.	+ 36 38 42.42	..	2
286	Leonis (3832)	T.	6 4.99	..	1	..	+ 0 44 42.	..	..
287	δ Leonis	T.	6 7.46	± 0.015	8	M.	+ 21 20 41.91	± 0.10	8
..		C.	7.51	± 0.015	18	C.	41.77	± 0.15	15
288	Bessel's Zone, 411	P.	6 48.62	..	2	P.	+ 38 23 42.53	..	2
289	δ Hydræ et Crateris	T.	11 50.63	± 0.012	7	M.	— 13 58 2.16	± 0.21	8
..		C.	50.69	± 0.023	12	C.	3.04	± 0.22	11
290	Anonymous	P.	13 29.76	..	1	P.	+ 38 20 42.35	..	1
291	Bessel's Zone, 411	P.	13 57.01	..	1	P.	+ 37 54 37.86	..	1
292	Bessel's Zone, 411	P.	15 46.30	..	2	P.	+ 38 3 27.91	..	2
293	Draconis (3906)	T.	21 3.70	..	1	..	+ 81 57 7.	..	..
294	Bessel's Zone, 411	P.	22 11.26	..	2	P.	+ 38 46 51.19	..	2
295	λ Draconis	T.	22 26.22	..	3	..	+ 70 9 29.	..	..
296	ι Leonis	T.	29 16.24	..	1	..	+ 0 0 13.	..	..
297	Leonis (3964)	C.	32 58.74	..	1	C.	+ 22 11 12.37	..	1
298	Anonymous	P.	36 58.86	..	1	P.	+ 38 45 20.05	..	1
299	Bessel's Zone, 411	P.	37 43.46	..	1	P.	+ 36 43 33.49	..	1
300	β Leonis	T.	41 24.21	± 0.015	8	M.	+ 15 24 38.81	± 0.09	9
..		C.	24.38	± 0.022	9	C.	37.88	± 0.72	5
301	β Virginis	T.	42 52.95	..	3	..	+ 2 36 37.	..	..
302	γ Ursæ Majoris	T.	45 54.92	± 0.020	7	M.	+ 54 31 43.72	± 0.21	8
..		C.	55.02	± 0.023	13	C.	42.78	± 0.43	12
303	Bessel's Zone, 411	P.	47 8.30	..	2	P.	+ 37 35 35.96	..	2
304	Bessel's Zone, 411	P.	52 26.57	..	2	P.	+ 37 33 54.17	..	2
305	Bessel's Zone, 411	P.	52 34.09	..	1	P.	+ 37 34 8.59	..	1
306	Bessel's Zone, 411	P.	53 57.87	..	1	P.	+ 36 52 50.90	..	1
307	Anonymous	P.	11 59 42.82	..	1	P.	+ 37 51 0.54	..	1
308	ε Corvi	C.	12 2 25.50	..	1	C.	— 21 47 16.07	..	1
309	Groombridge, 1860	..	7 35.	..	..	M.	+ 84 20 14.13	..	1
310	δ Ursæ Majoris	T.	7 58.72	± 0.048	5	..	+ 57 51 58.	..	..
311	η Virginis	T.	12 13.92	..	4	..	+ 0 10 2.	..	..
312	Bessel's Zone, 463	P.	12 41.32	..	1	P.	+ 38 44 8.35	..	1
313	Ursæ Minoris (4166)	..	14 38.	..	..	M.	+ 84 12 24.45	..	2
314	Ursæ Minoris (4193)	..	19 6.	..	..	M.	+ 84 15 36.69	..	2
315	δ Corvi	T.	22 6.51	..	1	..	. . . .	..	..
..		C.	6.57	..	1	C.	— 15 40 46.73	..	1
316	β Corvi	T.	26 30.90	± 0.012	17	M.	— 22 33 58.00	± 0.32	8
..		C.	30.96	± 0.020	15	C.	58.94	± 0.33	13
317	Bessel's Zone, 463	P.	12 27 50.73	..	1	P.	+ 37 15 10.75	..	1

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γ Virginis	T.	12 34 3.67	± 0.018	9	..	+ 0 37 34.	. .	..
Canum Venaticorum (4311)	P.	43 2.72	± 0.234	5	P.	+ 38 20 2.99	± 0.12	5
Canum Venaticorum (4345)	..	48 59.	..	..	M.	+ 39 7 33.63	. .	3
12 Canum Venaticorum	T.	49 0.08	± 0.022	11	M.	+ 39 7 46.69	± 0.12	7
	C.	0.23	± 0.011	17	C.	45.92	± 0.35	14
Bessel's Zone, 463	P.	50 46.01	..	2	P.	+ 37 32 27.79	. .	2
Canum Venaticorum (4384)	P.	58 43.05	..	2	P.	+ 36 36 10.76	. .	2
Comæ (4390)	T.	12 59 58.57	..	1	..	+ 28 25 53.	. .	..
Bessel's Zone, 463	P.	13 2 43.52	..	1	P.	+ 38 13 24.51	. .	1
Virginis (4449)	T.	10 34.18	..	1	..	+ 17 28 29.	. .	..
Bessel's Zone, 463	P.	14 21.51	..	4	P.	+ 38 38 41.39	. .	4
α Virginis	T.	17 17.76	± 0.011	35	M.	− 10 22 36.57	± 0.17	11
	C.	17.85	± 0.024	17	C.	36.78	± 0.32	16
Bessel's Zone, 463	P.	22 19.49	..	1	P.	+ 37 5 19.59	. .	1
Bessel's Zone, 463	P.	25 38.68	..	2	P.	+ 37 35 32.90	. .	2
Canum Venaticorum (4563)	P.	28 5.68	..	1	P.	+ 37 21 1.26	. .	1
Virginis (4565)	T.	33 44.65	..	3	..	− 7 56 38.29	. .	..
Anonymous	P.	37 56.05	..	1	P.	+ 37 21 1.26	. .	1
η Ursæ Majoris	T.	41 37.49	± 0.016	15	M.	+ 50 3 48.79	± 0.12	6
	C.	37.42	± 0.020	13	C.	47.99	± 0.30	14
Bessel's Zone, 463	P.	43 12.71	..	2	P.	+ 37 22 43.05	. .	2
Bessel's Zone, 463	P.	44 58.23	..	1	P.	+ 38 27 46.30	. .	1
η Bootis	T.	47 32.52	± 0.012	20	M.	+ 19 9 6.37	. .	4
	C.	32.58	± 0.026	10	C.	7.41	± 0.45	7
Anonymous	P.	48 8.34	..	1	P.	+ 37 52 25.13	. .	1
ϑ Centauri	T.	13 57 52.25	..	1	..	− 35 37 47.	. .	..
α Draconis	T.	14 0 19.82	..	3	..	+ 65 5 37.	. .	..
Bessel's Zone, 415	P.	14 1 19.61	..	1	P.	+ 37 27 49.29	. .	1
κ Virginis	T.	4 54.02	..	2	..	− 9 34 25.	. .	..
α Bootis	T.	8 49.19	± 0.013	18	M.	+ 19 57 56.64	± 0.17	10
	C.	49.25	± 0.020	18	C.	56.03	± 0.37	16
	P.	49.22	± 0.074	10	P.	56.74	± 0.31	10
Anonymous	T.	9 33.69	..	1	..	+ 20 50	. .	..
Anonymous	P.	17 15.42	..	1	P.	+ 37 53 16.00	. .	1
Anonymous	P.	22 0.14	..	1	P.	+ 38 13 46.68	. .	1
γ Bootis	T.	26 2.24	..	3	..	+ 38 57 59.	. .	..
Bootis (4825)	P.	28 30.56	..	1	P.	+ 37 17 14.41	. .	1
Bessel's Zone, 415	P.	29 6.96	..	1	P.	+ 37 47 55.64	. .	1
Anonymous	P.	34 58.90	..	1	P.	+ 38 47 17.29	. .	1
Bessel's Zone, 415	P.	36 35.79	..	1	P.	+ 37 23 53.39	. .	1
ε Bootis	T.	38 26.13	± 0.016	7	M.	+ 27 42 32.92	. .	1
	C.	26.14	± 0.016	7	C.	33.55	. .	4
Anonymous	P.	39 59.93	..	1	P.	+ 37 31 36.68	. .	1
α² Libræ	T.	42 35.25	± 0.023	9	..	. . . .	. .	..
	C.	35.23	± 0.057	12	C.	− 10 24 54.95	± 0.28	11
Bessel's Zone, 415	P.	43 13.12	..	2	P.	+ 38 25 53.93	. .	2
Anonymous	C.	43 16.19	..	1	C.	− 13 40 39.03	. .	1
Bootis (4906)	P.	44 34.51	..	1	P.	+ 37 53 23.90	. .	1
ξ² Libræ	T.	48 38.12	..	1	..	− 10 48 4.	. .	..
Libræ (4923)	C.	48 42.75	..	1	C.	− 20 43 58.14	. .	1
β Ursæ Minoris	T.	51 11.95	± 0.075	8	M.	+ 74 46 6.27	. .	4
	C.	11.69	± 0.098	10	C.	5.82	± 0.50	10
β Ursæ Minoris S. P.	..	. .	..	..	M.	4.87	. .	2
	C.	11.79	± 0.015	9	C.	7.59	± 0.59	9
Libræ (4950)	T.	14 55 18.01	..	1	..	+ 24 41 18.	. .	..
Bessel's Zone, 415	P.	15 0 42.66	..	2	P.	+ 37 2 8.21	. .	2

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364	β Libræ	T.	15 8 56.48	±	0.023	11	M.	− 8 49 32.53	±	0.33	6
..		C.	56.47	±	0.017	10	C.	32.76	±	0.40	9
365	Bessel's Zone, 415	P.	10 38.54		..	1	P.	+ 37 37 25.12		. .	1
366	Anonymous	P.	18 39.67		..	1	P.	+ 38 43 29.73		. .	1
367	μ Bootis	P.	18 47.82		..	1	P.	+ 37 54 20.68		. .	1
368	γ Libræ	T.	27 8.50		..	2	..	− 14 17 6.		. .	..
369	α Coronæ Borealis	T.	28 20.25	±	0.029	11	M.	+ 27 13 21.27	±	0.21	6
..		C.	20.28	±	0.017	12	C.	21.22	±	0.38	12
..		P.	20.32		..	3	P.	21.76		. .	3
370	ζ Coronæ Borealis	P.	33 43.26		..	2	P.	+ 37 7 32.08		. .	2
371	Bessel's Zone, 415	P.	34 50.80		..	1	P.	+ 38 0 14.13		. .	1
372	α Serpentis	T.	36 52.92	±	0.015	17	M.	+ 6 54 4.81	±	0.29	7
..		C.	52.92	±	0.013	15	C.	5.09	±	0.26	15
373	χ Lupi	T.	41 26.24		..	2	..	− 33 9 56.		. .	..
374	Anonymous	P.	45 20.93		..	1	P.	+ 38 0 25.12		. .	1
375	κ Coronæ Borealis	P.	45 34.39		..	2	P.	+ 36 7 33.63		. .	2
376	ζ Ursæ Minoris	T.	49 31.54	±	0.036	12	M.	+ 78 15 11.94	±	0.11	9
..		C.	31.42	±	0.066	15	C.	11.14	±	0.44	13
376	ζ Ursæ Minoris, S. P.	C.	31.37		..	2	C.	13.15		..	2
377	Bessel's Zone, 421	P.	50 26.19		..	1	P.	+ 37 9 43.25		..	1
378	δ Scorpii	T.	51 28.26		..	2	..	− 22 11 23.		..	..
379	Bessel's Zone, 421	P.	52 50.77		..	1	P.	+ 37 38 41.72		..	1
380	Bessel's Zone, 421	P.	53 28.73		..	1	P.	+ 37 22 19.50		..	1
381	β¹ Scorpii	T.	56 43.28	±	0.017	12	M.	− 19 23 24.92	±	0.16	6
..		C.	43.27	±	0.014	12	C.	26.40	±	0.08	9
382	β² Scorpii	..	. . .		..	..	M.	− 19 23 12.27	±	0.20	6
383	δ Ophiuchi	T.	16 6 29.28	±	0.014	12	M.	− 3 18 13.32	±	0.32	5
..		C.	29.31	±	0.019	15	C.	13.88	±	0.33	13
384	Anonymous	P.	12 32.75		..	2	P.	+ 35 4 2.28		..	2
385	Bessel's Zone, 421	P.	13 40.46		..	1	P.	+ 38 7 57.84		..	1
386	Bessel's Zone, 421	P.	14 54.04		..	1	P.	+ 37 20 15.51		..	1
387	Bessel's Zone, 421	P.	18 49.30		..	2	P.	+ 37 23 3.24		..	2
388	Herculis (5496)	P.	20 4.18		..	2	P.	+ 37 44 19.12		..	2
389	α Scorpii	T.	20 13.04	±	0.019	11	M.	− 26 5 37.89	±	0.23	9
..		C.	13.02	±	0.017	19	C.	39.09	±	0.30	17
390	η Draconis	T.	21 58.20		..	3	M.	+ 61 51 17.22		..	1
391	β Herculis	T.	23 46.34		..	2	..	+ 21 49 14.		..	..
392	τ Scorpii	T.	26 33.08		..	2	..	+ 27 53 56.		..	..
393	Bessel's Zone, 421	P.	33 56.83		..	1	P.	+ 38 38 33.86		..	1
394	Anonymous	P.	34 32.35		..	1	P.	+ 38 29 43.41		..	1
395	η Herculis	T.	37 45.45		..	3	..	+ 39 12 34.		..	..
396	Bessel's Zone, 421	P.	42 23.55		..	2	P.	+ 37 49 44.11		..	2
397	ε Ursæ Minoris	T.	17 1 31.18	±	0.075	8	M.	+ 82 16 31.15	±	0.35	5
..		C.	30.50	±	0.104	15	M.	30.54	±	0.43	13
..	S. P.	..	. . .		..	..	M.	32.13		..	2
..	S. P.	C.	31.40		..	3	C.	33.33		..	3
398	η Ophiuchi	T.	1 46.80	±	0.034	6	..	− 15 32 2.		..	..
399	Herculis (5788)	P.	2 42.61		..	3	P.	+ 36 7 59.88		..	3
400	Bessel's Zone, 421	P.	4 28.86		..	1	P.	+ 38 29 0.25		..	1
401	α Herculis	T.	7 48.54	±	0.023	11	M.	+ 14 33 55.98		..	1
..		C.	48.55	±	0.016	9	C.	54.47	±	0.50	7
402	π Herculis	P.	9 49.08		..	2	P.	+ 36 58 53.14		..	2
403	ξ Ophiuchi	T.	12 1.09		..	1	..	− 20 56 46.		..	..
404	Herculis (5847)	P.	12 30.14		..	3	P.	+ 37 27 5.68		..	3
405	ϑ Ophiuchi	T.	12 48.10		..	3	..	− 24 50 42.		..	..
406	ρ Herculis	P.	18 29.92		..	1	P.	+ 37 17 12.68		..	1
407	Bessel's Zone, 421	P.	18 57.72		..	1	P.	+ 38 43 15.21		..	1

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		1850.0.				1850.0.		
		h. m. s.	s.			° ′ ″	″	
Bessel's Zone, 421	P.	17 19 15.52	..	1	P.	+ 37 5 18.70	.	1
λ Herculis	T.	24 40.65	..	3	..	+ 36 13 41.	..	..
β Draconis	T.	27 2.66	..	2	M.	+ 52 24 52.03	± 0.10	8
	C.	2.96	..	2	C.	51.79	..	3
Bessel's Zone, 480	P.	27 8.02	..	1	P.	+ 35 52 58.81	..	1
α Ophiuchi	T.	27 58.32	± 0.022	9	M.	+ 12 40 23.80	± 0.25	5
	C.	58.34	± 0.019	15	C.	24.65	± 0.36	16
Ophiuchi (5987)	T.	34 26.66	..	3	..	+ 31 17 9.	..	..
ι Herculis	T.	17 35 13.84	..	1	..	+ 46 5 19.	..	..
β Ophiuchi	T.	36 3.79	..	4	..	+ 4 38 3.	..	..
γ Ophiuchi	T.	40 22.29	..	1	..	....	..	..
	C.	22.27	..	1	C.	+ 2 46 7.66	..	1
Bessel's Zone, 480	P.	42 23.91	..	1	P.	+ 36 10 58.77	..	1
Serpentis (6049)	T.	44 43.50	..	1	..	— 10 51 33.	..	..
Anonymous	P.	45 49.38	..	1	P.	+ 37 45 1.95	..	1
Herculis (6073)	T.	49 22.08	..	1	..	+ 26 4 41.	..	..
ξ Draconis, S. P.	T.	50 56.15	..	3	..	+ 56 53 51.	..	..
γ Draconis	T.	53 7.43	± 0.040	7	M.	+ 51 30 30.37	± 0.16	6
	C.	7.47	± 0.027	16	C.	29.54	± 0.38	14
Ophiuchi, 6143	T.	18 0 14.22	..	1	..	+ 9 32 48.	..	..
Bessel's Zone, 480	P.	4 45.93	..	1	P.	+ 36 26 20.61	..	1
μ Sagittarii	T.	4 47.54	± 0.023	9	M.	— 21 5 34.26	..	4
	C.	47.28	± 0.014	21	C.	35.15	± 0.33	18
κ Lyræ	P.	14 36.14	..	2	P.	+ 36 0 0.62	..	2
Anonymous	P.	16 12.84	..	1	P.	+ 36 52 43.46	..	1
λ Sagittarii	T.	18 42.71	..	1	..	....	..	..
	C.	42.75	..	1	C.	— 25 29 50.51	..	3
Anonymous	..	19 17.	..	..	M.	— 85 40 0.53	..	3
δ Ursæ Minoris	T.	20 43.56	± 0.102	31	M.	+ 86 35 49.71	..	3
	C.	43.18	± 0.153	12	C.	48.25	± 0.07	8
S. P.	..	..	..	..	M.	49.32	± 0.11	9
S. P.	C.	42.16	± 0.271	9	C.	51.74	± 0.42	10
α Lyræ	T.	31 51.57	± 0.018	17	M.	+ 38 38 48.82	± 0.07	50
	C.	51.59	± 0.012	39	C.	49.75	± 0.14	35
	P.	51.27	± 0.071	27	P.	49.82	± 0.05	29
ζ¹ Lyræ	P.	37 36.26	..	2	P.	+ 37 26 55.80	..	2
Herculis (6387)	C.	39 12.45	..	1	..	+ 20 24 24.	..	..
ζ Lyræ	T.	39 36.33	± 0.030	6	..	+ 37 27 8.	..	..
β Lyræ	T.	44 32.48	± 0.013	14	M.	+ 33 11 29.03	± 0.13	13
	C.	32.54	± 0.016	10	C.	29.95	± 0.37	7
	P.	32.48	..	2	P.	30.01	..	2
σ Sagittarii	T.	45 57.69	..	1	..	— 26 28 39.	..	..
ξ² Sagittarii	T.	48 46.88	..	2	..	— 21 17 53.	..	..
δ² Lyræ	P.	49 15.32	..	3	P.	+ 36 42 39.88	..	3
ο Sagittarii	T.	55 41.42	..	1	..	....	..	..
	C.	41.66	..	1	C.	— 21 57 18.58	..	1
ζ Aquilæ	T.	58 30.89	± 0.013	12	M.	+ 13 38 39.98	± 0.11	12
	C.	30.92	± 0.018	13	C.	41.51	± 0.28	10
π Sagittarii	T.	19 0 50.41	± 0.043	5	..	— 21 15 23.	..	..
η Lyræ	T.	8 39.14	± 0.037	6	M.	+ 38 53 26.63	± 0.33	5
	C.	38.82	..	2	C.	27.55	..	1
	..	..	..	..	P.	29.04	..	2
ϑ Lyræ	P.	11 9.44	..	..	P.	+ 37 52 10.10	..	1
δ Draconis, S. P.	T.	12 30.27	..	4	..	+ 67 23 51.	..	..
Aquilæ (6615)	T.	12 39.22	..	1	..	+ 12 6 9.	..	..
ρ¹ Sagittarii	T.	12 58.13	± 0.042	6	..	— 18 7 27.	..	..
Anonymous	P.	13 44.52	..	1	P.	+ 37 10 17.13	..	1
δ Aquilæ	T.	17 56.04	± 0.010	15	M.	+ 2 49 11.12	± 0.13	7
	C.	56.04	± 0.012	18	C.	11.90	± 0.21	17

No.	NAME.	Inst.	RIGHT ASCENSION. 1850.0.		No. of Obs.	Inst.	DECLINATION. 1850.0.	
			h. m. s.	s.			° ′ ″	″
449	α Vulpeculæ	T.	91 22 27.77	..	1	..	+ 24 21 53.	..
450	β Cygni	T.	24 40.26	± 0.034	6	..	+ 27 38 54.	..
451	Cygni (6722)	P.	30 23.75	..	1	P.	+ 36 36 52.76	..
452	α Sagittæ	C.	33 23.41	..	1	C.	+ 17 40 21.41	..
453	Sagittarii (6742)	T.	33 56.04	± 0.033	7	..	− 16 28 12.	..
454	Cygni (6771)	P.	38 51.30	..	3	P.	+ 36 59 42.02	..
455	γ Aquilæ	T.	39 7.61	± 0.012	16	M.	+ 10 15 4.98	± 0.09
..		C.	7.63	± 0.015	16	..	6.03	± 0.20
456	α Aquilæ	T.	43 27.79	± 0.013	21	M.	+ 8 28 33.79	± 0.11
..		C.	27.81	± 0.018	19	C.	34.35	± 0.31
457	Sagittarii (6803)	T.	43 28.64	..	2	..	− 19 25 18.	..
458	Cygni (6813)	P.	45 14.97	..	1	P.	+ 38 20 21.66	..
459	β Aquilæ	T.	47 56.64	± 0.012	15	M.	+ 6 2 9.33	+ 0.11
460	Cygni (6849)	P.	50 29.56	..	3	P.	+ 38 5 27.44	..
461	Anonymous	P.	20 0 47.21	..	1	P.	+ 35 33 44.34	..
462	Anonymous	P.	1 56.86	..	1	P.	+ 33 2 41.58	..
463	ϑ Aquilæ	T.	3 33.75	± 0.012	6	..	− 1 15 44.	..
464	Cygni (6937)	P.	3 51.22	..	4	P.	+ 36 24 3.39	..
465	Bessel's Zone, 314	P.	6 11.41	..	1	P.	+ 38 26 2.34	..
466	Bessel's Zone, 314	P.	7 54.58	..	1	P.	+ 38 18 52.99	..
467	Bessel's Zone, 314	P.	8 29.30	..	1	P.	+ 38 42 20.07	..
468	Cygni, 6967	P.	8 54.58	..	1	P.	+ 36 20 58.76	..
469	α¹ Capricorni	C.	9 19.62	..	1	M.	− 12 58 3.82	± 0.19
470	α² Capricorni	T.	9 43.63	± 0.014	16	M.	− 13 0 20.76	± 0.14
..		C.	43.63	± 0.014	21	C.	20.84	± 0.21
471	Bessel's Zone, 487	P.	10 36.22	..	2	P.	+ 38 26 25.92	..
472	Bessel's Zone, 486	P.	10 52.28	..	1	P.	+ 36 35 47.15	..
473	Cygni (6990)	P.	12 15.30	..	1	P.	+ 37 34 8.69	..
474	β Capricorni	T.	12 34.66	± 0.042	5	..	− 15 15 3.	..
475	λ Ursæ Minoris	T.	13 1.37	± 0.376	23	M.	+ 88 51 38.20	± 0.11
..		C.	0.82	..	3	C.	38.31	..
..	S. P.	..	. . .	..	..	M.	37.62	± 0.34
..	S. P.	..	. . .	..	..	C.	40.41	..
476	Anonymous	P.	13 29.48	..	2	P.	+ 38 32 13.16	..
477	Bessel's Zone, 314	P.	17 27.93	..	4	P.	+ 38 43 53.91	..
478	Anonymous	P.	22 0.93	..	1	P.	+ 37 57 1.63	..
479	Anonymous	P.	22 54.74	..	1	P.	+ 38 49 55.13	..
480	Cygni	C.	23 16.10	..	1	C.	+ 29 52 15.77	..
481	Anonymous	P.	31 44.83	..	2	P.	+ 37 48 34.24	..
482	Bessel's Zone, 314	P.	33 0.34	..	1	P.	+ 38 7 6.18	..
483	α Cygni	T.	36 19.07	± 0.012	15	M.	+ 44 44 47.36	± 0.14
..		C.	19.13	± 0.033	11	C.	47.44	± 0.27
484	ε Aquarii	T.	39 33.05	± 0.025	7	..	− 10 2 30.	..
485	Bessel's Zone, 312	P.	41 11.81	..	1	P.	+ 33 49 30.89	..
486	λ Cygni	P.	41 33.69	..	2	P.	+ 35 56 31.16	..
487	Bessel's Zone, 314	P.	42 19.84	..	1	P.	+ 38 42 20.07	..
488	μ Aquarii	T.	44 33.50	± 0.026	5	..	− 9 32 35.	. .
489	Anonymous	P.	47 38.07	..	1	P.	+ 38 46 31.77	. .
490	Bessel's Zone, 313	P.	48 50.47	..	1	P.	+ 36 30 18.36	. .
491	Bessel's Zone, 313	P.	55 14.43	..	2	P.	+ 35 26 25.69	. .
492	Cygni (7320)	P.	57 15.33	..	1	P.	+ 38 4 0.21	. .
493	61¹ Cygni	T.	21 0 10.64	± 0.012	25	M.	+ 38 0 51.94	± 0.09
..		C.	10.65	± 0.026	18	C.	52.69	± 0.17
..		P.	10.21	± 0.180	5	P.	52.91	± 0.16
494	61² Cygni	T.	0 12.05	..	1	M.	+ 38 0 48.02	± 0.12
..		C.	12.10	± 0.048	6	C.	49.87	± 0.31
..		P.	11.79	..	4	P.	49.21	. .

.	NAME.	Inst.	RIGHT ASCENSION.		No. of Obs.	Inst.	DECLINATION.		No. of Obs.
			1850.0.				1850.0.		
			h. m. s.	s.			° ′ ″	″	
5	ν Aquarii	T.	21 1 24.97	..	2	..	— 11 38 52.	..	..
6	Anonymous	P.	5 1.71	..	3	P.	+ 35 41 19.84	..	3
7	ζ Cygni	T.	6 33.18	± 0.010	22	M.	+ 29 36 50.57	± 0.12	11
		C.	33.28	± 0.026	11	C.	51.25	± 0.34	10
		P.	33.12	..	2	P.	52.95	..	2
8	Anonymous	P.	6 35.05	..	2	P.	+ 37 57 7.69	..	2
9	Bessel's Zone, 313	P.	6 49.24	..	2	P.	+ 35 11 0.82	..	2
0	Bessel's Zone, 313	P.	7 24.60	..	2	P.	+ 36 1 0.08	..	2
1	Anonymous	P.	8 30.55	..	3	P.	+ 38 37 21.35	..	3
2	τ Cygni	P.	8 48.39	..	2	P.	+ 37 24 25.40	..	2
3	δ Cygni	T.	11 31.52	± 0.015	7	..	.....	..	..
		P.	31.03	..	3	P.	+ 38 46 5.88	..	3
4	Bessel's Zone, 314	P.	13 23.16	..	2	P.	+ 38 10 31.98	..	2
5	Anonymous	P.	13 23.23	..	1	P.	+ 37 36 23.11	..	1
6	Bessel's Zone, 314	P.	13 40.50	..	2	P.	+ 38 10 13.51	..	2
7	α Cephei	T.	14 59.57	± 0.036	17	M.	+ 61 57 4.60	± 0.15	13
	Ref.	..	...	..	..	M.	7.24	..	1
		C.	59.57	± 0.026	12	C.	4.31	± 0.21	13
	S. P.	C.	58.48	..	1	C.	3.38	..	1
8	Anonymous	P.	17 25.56	..	1	P.	+ 38 3 10.59	..	1
9	Bessel's Zone, 313	P.	17 43.63	..	2	P.	+ 36 42 37.05	..	2
0	Bessel's Zone, 313	P.	19 39.72	..	1	P.	+ 36 1 18.15	..	1
1	Cygni (7462)	P.	21 14.45	..	2	P.	+ 36 28 1.61	..	2
2	β Aquarii	T.	23 39.41	± 0.015	18	M.	— 6 13 41.94	± 0.19	11
		C.	39.49	± 0.014	15	C.	40.53	± 0.25	7
3	β Cephei	T.	26 42.00	± 0.041	7	M.	+ 69 54 9.72	± 0.10	10
	S. P.	..	...	..	..	M.	7.90	..	1
		C.	42.18	± 0.045	15	C.	10.31	± 0.20	15
14	Cygni (7505)	P.	28 39.30	..	2	P.	+ 37 51 49.15	..	2
15	Bessel's Zone, 314	P.	28 53.90	..	1	P.	+ 38 46 9.30	..	1
16	Bessel's Zone, 312	P.	34 42.35	..	1	P.	+ 33 59 44.28	..	1
17	ε Pegasi	T.	36 49.08	± 0.014	13	M.	+ 9 11 22.72	± 0.12	20
		C.	49.09	± 0.013	20	C.	23.17	± 0.18	20
18	Cygni (7566)	P.	37 13.35	..	2	P.	+ 37 35 56.74	..	2
19	δ Capricorni	T.	38 45.35	..	3	..	+ 16 48 17.;	..	..
20	Bessel's Zone, 314	P.	38 46.83	..	2	P.	+ 38 50 40.69	..	2
21	Anonymous	P.	39 22.85	..	1	P.	+ 35 10 3.60	..	1
22	Bessel's Zone, 213	P.	41 49.21	..	1	P.	+ 35 53 11.58	..	1
23	Anonymous	P.	42 15.57	..	1	P.	+ 37 57 12.33	..	1
4	γ Gruis	T.	44 50.03	..	1	..	— 38 4 4.	..	..
5	Bessel's Zone, 314	P.	44 52.06	..	2	P.	+ 38 50 10.58	..	2
6	Anonymous	P.	45 47.01	..	3	P.	+ 38 15 4.85	..	3
7	Anonymous	P.	46 1.19	..	1	P.	+ 38 13 7.74	..	1
8	Pegasi (7627)	C.	46 15.16	..	1	C.	+ 25 13 17.96	..	1
9	Bessel's Zone, 314	P.	46 33.47	..	1	P.	+ 38 7 56.11	..	1
0	Bessel's Zone, 313	P.	48 56.97	..	1	P.	+ 35 26 19.37	..	1
1	Aquarii (7648)	T.	50 18.97	± 0.022	10	M.	— 13 22 48.10	± 0.17	9
		C.	18.90	± 0.036	5	C.	48.67	..	4
2	Weisse XXI, 1223	T.	52 19.37	..	2	M.	— 13 34 12.63	..	3
3	Weisse XXI, 1240	T.	53 0.00	..	1	M.	— 13 44 28.10	..	1
		C.	52 59.77	..	2	C.	21.89	..	1
4	Bessel's Zone, 312	P.	53 45.85	..	1	P.	+ 33 54 43.15	..	1
5	Bessel's Zone, 313	P.	55 49.84	..	2	P.	+ 36 15 42.60	..	2
6	α Aquarii	T.	58 4.64	± 0.023	9	M.	— 1 2 46.69	± 0.24	5
		C.	4.56	± 0.030	8	C.	46.98	± 0.29	8
7	ι Aquarii	T.	58 19.83	..	2	..	— 14 35 43.	..	..
8	α Gruis	T.	58 45.14	± 0.049	5	..	— 47 41 3.	..	..

No.	NAME.	Inst.	RIGHT ASCENSION. 1850.0.		No. of Obs.	Inst.	DECLINATION. 1850.0.		No. of Obs.
			h. m. s.	s.			° ′ ″	″	
539	Pegasi (7693)	C.	21 58 47.04	..	..	C.	+ 28 14 15.18	..	1
540	Lacertæ (7765)	..	. . .	..	..	M.	+ 38 58 21.72	± 0.11	7
..	. . . . .	C.	22 7 26.68	..	4	C.	19.53	..	4
541	ϑ Aquarii	T.	8 54.89	..	3	..	− 8 31 41.	..	..
542	Lacertæ (7777)	T.	9 26.05	..	4	..	. . . .	..	..
..	. . . . .	P.	26.11	..	3	P.	+ 37 0 12.92	..	3
543	Bessel's Zone, 380 . . .	P.	11 19.60	..	1	P.	+ 38 16 37.06	..	1
544	γ Aquarii	T.	13 54.42	± 0.029	5	..	− 2 8 29.	..	..
545	Pegasi (7798)	C.	14 23.91	..	1	C.	+ 27 34 37.08	..	1
546	Anonymous	P.	20 6.64	..	2	P.	+ 36 40 55.43	..	2
547	η Aquarii	T.	27 38.83	± 0.013	5	..	− 0 53 21.	..	..
548	Lacertæ (7880)	T.	29 12.98	..	3	..	. . . .	..	..
..	. . . . . .	P.	11.14	..	3	P.	+ 38 51 34.17	..	3
549	Anonymous	P.	29 19.36	..	1	P.	+ 34 48 18.78	..	1
550	Anonymous	P.	29 21.71	..	1	P.	+ 35 59 13.47	..	1
551	Bessel's Zone, 379 . . .	P.	29 38.66	..	3	P.	+ 37 3 59.82	..	3
552	Bessel's Zone, 379 . . .	P.	32 17.99	..	1	P.	+ 36 35 46.88	..	1
553	Lacertæ (7901)	P.	32 32.21	± 0.139	6	P.	+ 38 16 15.51	± 0.14	6
554	Bessel's Zone, 379 . . .	P.	32 44.83	..	2	P.	+ 36 34 27.65	..	2
555	Anonymous	P.	33 47.66	..	1	P.	+ 36 48 44.82	..	1
556	ζ Pegasi	T.	33 58.90	± 0.017	16	M.	+ 10 3 0.10	± 0.21	12
..	. . . . . .	C.	58.86	± 0.049	14	C.	0.02	± 0.34	13
557	Bessel's Zone, 379 . . .	P.	41 19.31	..	2	P.	+ 36 37 43.83	..	2
558	λ Aquarii	T.	44 47.14	..	4	..	− 8 22 34.	..	..
559	Bessel's Zone, 379 . . .	P.	48 4.67	..	2	P.	+ 36 16 42.39	..	2
560	α Piscis Australis	T.	49 21.09	± 0.024	13	M.	− 30 24 57.14	± 0.17	21
..	. . . .	C.	20.89	± 0.016	20	C.	58.21	± 0.27	20
561	ο Andromedæ	T.	55 1.69	..	1	..	+ 41 31 18.	. .	..
562	α Pegasi	T.	57 17.48	± 0.012	17	M.	+ 14 23 52.20	± 0.16	8
..	. . . . . .	C.	17.51	± 0.012	20	C.	58.60	± 0.28	20
563	Pegasi (8052)	T.	59 48.55	..	1	..	+ 24 39 35.	. .	..
564	Bessel's Zone, 379 . . .	P.	23 2 52.63	..	1	P.	+ 36 2 59.80	. .	1
565	Bessel's Zone, 379 . . .	P.	2 56.09	..	2	P.	+ 36 2 9.55	. .	2
566	φ Aquarii	T.	6 33.13	..	2	..	− 6 51 23.	. .	..
567	γ Piscium	T.	9 23.47	..	2	..	. . .	. .	..
..	. . . . . .	C.	23.19	..	1	C.	+ 2 57 57.77	. .	1
568	ψ³ Aquarii	T.	11 9.41	..	3	..	− 10 25 48.	. .	..
569	Andromedæ (8136) . . .	P.	13 39.61	..	1	P.	+ 37 21 51.68	. .	1
570	Aquarii (8144)	T.	15 5.24	..	2	..	− 20 55 5.	. .	..
571	Anonymous, S. P. . . .	T.	15 49.40	..	1	..	+ 66 8	. .	..
572	Bessel's Zone, 379 . . .	P.	17 26.72	..	2	P.	+ 35 32 20.82	. .	2
573	Anonymous, S. P. . . .	T.	19 20.05	..	1	..	+ 66 8	. .	..
574	Bessel's Zone, 387 . . .	P.	21 21.58	..	1	P.	+ 38 47 39.61	. .	1
575	Andromedæ (8195) . . .	P.	23 55.24	..	1	P.	+ 38 24 46.29	. .	1
576	Bessel's Zone, 384 . . .	P.	30 2.96	..	1	P.	+ 34 59 10.05	. .	1
577	ι Piscium	T.	32 14.26	± 0.021	10	M.	+ 4 48 51.58	. .	1
..	. . . . . .	C.	14.22	..	2	C.	50.03	. .	2
578	Anonymous	T.	32 51.95	..	1	..	+ 62 56	. .	..
579	Bessel's Zone, 379 . . .	P.	33 11.94	..	2	P.	+ 35 53 19.71	. .	2
580	γ Cephei	T.	33 13.89	± 0.046	12	M.	+ 76 47 43.32	± 0.15	16
:	Ref.	..	. . .	..	..	M.	45.20	. .	3
..	S. P.	..	. . .	..	..	M.	42.77	± 0.22	8
..	. . . . . .	C.	13.78	± 0.062	24	C.	43.23	± 0.19	22
..	S. P.	C.	13.99	± 0.181	9	C.	42.98	± 0.44	8
581	λ Piscium	T.	34 23.54	..	1	..	+ 0 57 20.	. .	..
582	Pegasi (8250)	T.	35 44.44	..	1	..	+ 9 29 55.	. .	..
583	Piscium (8262)	T.	38 43.72	..	2	..	+ 2 39 20.	. .	..

No.	NAME.	Inst.	RIGHT ASCENSION. 1850.0		No. of Obs.	Inst.	DECLINATION. 1850.0		No. of Obs.
			h. m. s.	s.			° ′ ″	″	
584	Piscium (8271)	T.	23 40 13.88	..	1	..	— 3 35 42.	. .	..
585	Anonymous, S. P. . . .	T.	40 51.82	..	1	..	+ 63 1	. .	..
586	Pegasi (8284)	T.	42 4.32	..	1	..	+ 28 0 28.	. .	..
587	Anonymous, S. P. . . .	T.	43 6.76	..	1	..	+ 62 56	. .	..
588	Anonymous, S. P . . .	T.	43 40.88	..	1	..	+ 63 11	. .	..
589	Pegasi (8296)	P.	44 47.12	..	1	..	+ 20 50 15.	. .	..
590	Anonymous	P.	46 29.56	..	2	P.	+ 38 26 49.00	. .	2
591	Bessel's Zone, 384 . . .	T.	50 2.72	..	1	P.	+ 34 59 11.75	. .	1
592	Pegasi (8350)	T.	54 20.73	..	1	..	+ 26 17 20.	. .	..
593	Anonymous	T.	54 25.08	± 0.020	5	M.	— 0 25 12.20	. .	2
594	Bessel's Zone, 387 . . .	P.	59 5.87	..	1	P.	+ 37 47 25.21	. .	1
595	Anonymous	T.	23 59 27.54	..	1	M.	— 0 29 43.43	. .	1

T. denotes the Transit Instrument.
M. " " Mural Circle.
C. " " Meridian Circle.
P. " " Prime Vertical Transit Instrument.

0.0791

[illegible]

APPENDIX.

OBSERVATORY, *Washington*, *Jan.* 1, 1850.

To the Hon. WM. BALLARD PRESTON, *Secretary of the Navy.*

SIR: The detail of officers from the Observatory for the Mexican war; the frequent changes that have been made among them since, by calling them away for sea service almost as soon as they have learned to be useful, together with the burning of Alexander's printing establishment, with a large portion of the observations for 1846, have all conspired to retard the publication of this volume.

In the Autumn of 1846, after the planet Neptune had been discovered by Leverrier, and seen by Dr. Galle and others; and after it had been observed here for some time, it was made the duty of Mr. Walker, one of the assistants at the Observatory, to endeavor, with the aid of such observations as might reach us, to trace the path of the planet backwards, in order to ascertain if it had not been observed by some astronomer before, and entered among his observations as a fixed star.

In this undertaking Mr. Walker was successful. On the 1st of February, 1847, he reported to me a list of 14 stars, from *Lalande's* catalogue, which answered to the description of the new planet, and near the places of which, according to his computations, he made Neptune to be in May, 1795, when the French astronomer observed these stars for his great work, the "*Histoire Celeste.*"

Among these stars there was one in particular which answered better than any of the rest to the description, and probable place of Neptune, in May, 1795. This Mr. Walker singled out as the star which it was most likely would not be found in that part of the heavens where Lalande saw it.

The list was given to Professor Hubbard, another of my assistants, with directions to examine the heavens the first opportunity, with the large Equatorial, and to report whether or not, all the stars of the list were in their places.

An opportunity to do this did not occur, on account of clouds, till the night of February 4. He then made the examination, and reported that the suspected star was missing.

It turned out to be Neptune, and that Lalande, not suspecting it to be a planet, had observed and recorded it as a fixed star, both on the nights of 8th and 10th of May, 1795.

This was an important discovery; for it at once gave astronomers the benefit of observations more than fifty years old; which enabled them to compute an orbit at once for the new planet and to determine its elements.

On the same day that the paper containing the announcement of this great discovery at the National Observatory in Washington, was placed in the hands of Leverrier, in Paris, a communication announcing the same discovery at the Altona Observatory was also placed in his hands.

The Washington Observatory had the priority, and its claim has never been disputed: for with the date of its discovery, it was seven days in advance of the other.

Though this is the most recently discovered of the primary planets, Lieut. Davis, the Superintendent of the American Nautical Almanac, has, in consequence of the discoveries made at this Observatory with regard to it, been enabled to publish an ephemeris of it for two years in advance of the other planets, and of all other parts of the Nautical Almanac.

In consequence of the unavoidable circumstances which have contributed to delay the publication of this volume, and in consideration of the very high degree of interest attached to the history of this planet, and to the labors of the Observatory as connected with it, I have consented that the Secretary of the Smithsonian Institution, might publish in the "Smithsonian Contributions," with the proper acknowledgments to the Observatory, so much of a paper by Mr. Walker on the planet Neptune as relates to this discovery and to the labors of the Observatory connected therewith and preformed by Mr. Walker while attached to this office as one of my assistants.

The labors whether of mind or body, performed under the requirements of duty, by all persons in the pay and employment of a public Institution like this, are the property of such institution; and the rules of the Observatory forbid that any assistant should, without leave, forestall the Observatory, and publish accounts of the labors which he has been required to perform.

The grounds upon which this rule is based, are obvious; assistants are employed by the Observatory to perform certain labors for it; the fruits of these labors belong to it. They are its property, its capital—which can only be made public through its regularly constituted organs.

In this instance, however, I judged it proper, for the reasons above stated, to waive the rule, and to consent that so much of the paper already alluded to, as relates to the labors performed by Mr. Walker, as an employé of the Observatory, might be published in advance in the " Smithsonian Contributions," upon conditions, as before said, of proper acknowledgments.

For a more detailed account, therefore, of the history of this discovery and its importance, I beg leave to refer you to the aforesaid papers as they may appear in the "Smithsonian Contributions to knowledge."

It has been the good fortune of this Observatory, since the date of its last volume of observations, to make another discovery of no little interest.

I allude to the separation of Beila's Comet into two parts. That that Comet had exploded or separated, was observed by me on the night of January 13, 1846. This was the first discovery of that phenomenon.

For a detailed account of this discovery, and particulars connected with it, I beg leave to refer you to my official communications to the Department at the time, and to that part of the present volume in which these observations are treated.

By authority of Mr. Secretary John Y. Mason, your immediate predecessor in office, I ordered and procured from Ertel & Son, of Munich, a portable astronomical instrument, for the purpose of ascertaining through Magnetic Telegraph, the difference of Longitude between this Observatory and various other points throughout the country, within reach of the lines of Telegraph.

To perfect, and to afford the means of perfecting the Geography of the country, by ascertaining with accuracy the Latitude and Longitude of the various places which serve as points of departure for the mariner, the traveller, the surveyor and geographer, has in other countries been considered the peculiar province, and one of the principal objects and aims of a National Observatory. It is peculiarly so in this country, and in Russia; whose territories cover, without the interposition of seas and other blank spaces, so large an extent of the earth's surface.

The Director of the Imperial Observatory of Russia, has devoted much of his time and attention to this subject and has rendered services in connection therewith which are valuable to his country, and of importance to the world.

The extension of the Magnetic Telegraph in the United States, together with the Electro Chronograph with which this Observatory is provided, places within my reach facilities for connecting remote points of the country, by differences of Longitude with its capital, which no Director of such an institution has ever before enjoyed.

The instrument referred to' is constructed upon a new and original plan, and its powers are such that the Latitude may be determined at the same time and place, and with quite as much accuracy as the Longitude by the most improved chronographic methods.

Every thing is now ready for the commencement of this duty. I only wait your instructions with regard to it, which I hope to receive at an early day.

There is a growing interest felt throughout the United States with regard to the pursuit of practical astronomy; and the establishment of observatories, either by corporations or by individual liberality in various parts of the Union, serves greatly to increase the importance of the undertaking, and to enlarge the advantages which the public would derive from the connecting, by Telegraphic Longitude, such observatories with this. Those observatories, by the co-operation which they no doubt would gladly give, would facilitate the operation; and when the work should be completed, all their observations, works and labors, would become available also for our purposes here.

During the years of 1846, '7, and '8, the great work of making a catalogue of all the stars down to the 9.10 magnitude, that are visible from this parallel of Latitude was industriously prosecuted, so industriously indeed that the corps of computers proved altogether insufficient to keep pace with the observers.

Unreduced observations are worthless. An attempt was made to get the belts that were swept over for the catalogue in 1846 ready for the press, with the other observations that are printed in this volume; but owing to the continual drafts which have been made upon the force of the Observatory for officers for sea service, I have been compelled not only to abandon this attempt but partially to suspend the labor of observing for a catalogue.

My regrets, however, at finding myself under this necessity, were lessened in consequence of the changes and improvements in the plan and methods of observing which at the beginning of the year 1849, I perceived would result from Dr. Locke's discovery of the Electro-Chronograph, as the whole apparatus consisting of clock, battery, registering apparatus, and all the machiney and implements used to record, *electro-chronographically*, an astronomical observation, is here called.

On the 30th December, 1848, Dr. Locke, from Cincinnati, Ohio, his place of residence, informed me by letter of his discovery.

Perceiving its value and great importance, I lost no time in calling the attention of the Government to it, and in requesting that authority should be given to obtain for the use of the Government Dr. Locke's invention.

At first, in alluding to the thing invented, Dr. Locke called it a "Magnetic Clock." This was calculated to create erroneous impressions in the minds of others, and perceiving its tendency, I suggested to the Dr. by letter, of February 15th, the propriety of distinguishing his invention by a name which should be less calculated to mislead, and be more descriptive than the "Magnetic Clock." He has since called it the "Electro-Chronograph."

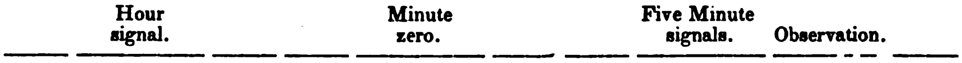
A portion of the official correspondence in relation to the Electro-Chronograph, may not be out of place here. So much of it is given as is possessed of any general interest.

Dr. Locke to Lieutenant Maury:

CINCINNATI, *December* 30, 1848.

DEAR SIR:—I enclose to you a specimen of the performances of my late invention, the Telegraphic Clock for Longitude. The clock breaks and closes the circuit in such a manner that the seconds are registered in lines about half of an inch long, with short breaks between them. This is done without any interference with the pendulum. To indicate the minute zero, a break is omitted when two lines run into one, about one inch long.

Every five minutes, a long line (3 seconds) *follows* the minute zero. Of course the five minutes terminate at the minute zero. Every hour a similar dash *precedes* the minute zero, each of these dashes is separated from the minute zero by a few distinct seconds. At the commencement of an hour, the three signals come together thus:



Star transits are marked by blanks or breaks made by a finger key under the hand of the observer, (see specimen.) The commencement of the break is the punctum of time of the observation. As this may happen between the little breaks between seconds, and be thus a little (one-tenth second) indefinite, I have invented a key which shall measure the breaks and make either end available. By scale and dividers these breaks can be measured to hundredths of a second. The use of such a clock to determine longitude on a telegraphic line is evident. It occurred to me that it might also be useful in a local observatory as a faithful and convenient register of observations, and especially as it subdivides seconds very accurately. It would relieve the observer from ocular and auricular clock trouble, which, when there is a noise about you is often vexatious. The observer has only to watch the transit and press the key at every wire, without ever taking his eye from his telescope. If not used as a substitute for usual clock readings, it might be a convenient check and auxiliary. If it is thought that it will be useful, it has been proposed that two such clocks be made by our government, one for your Observatory, and the other for the Coast Survey. The operation of my clock is as perfect as I could wish, so far as I have observed, and the machinery does not appear to interfere with its rate.

Mostly, in the observations, the hour and five minute signals would be of little or no use, and might be thrown out of action.

Very respectfully,
Your obliged friend,
JOHN LOCKE.

Lieut. Maury to Dr. Locke.

OBSERVATORY, WASHINGTON CITY, *January* 5, 1849.

SIR: I am in receipt of your highly interesting letter of the 30th ult., relating to your invention of the Telegraphic clock.

I regard it as one of the most important inventions of the age ; and most heartily do I congratulate you upon it.

Allow me to say that feelings of professional pride, give additional zest and warmth to these congratulations.

For ages the problem of Longitude has occupied the mind of wise men, and commanded the attention of governments. Large rewards, you know, have been offered by governments for the means of simplifying this problem. This discovery of yours is the crowning work in the great problem, and it is thereby reduced to the utmost degree of simplicity and accuracy.

Permit me to claim this high honor, first for my country, and next for the Navy.

An American Naval Officer, Captain Wilkes, was the first to apply the Magnetic Telegraph to the practical determination of Longitude. He, you recollect, used it some five or six years ago, in determining the difference of Longitude between this city and Baltimore. This was a great improvement upon all other methods which had been practised up to that time; for it brought the determinations down to the nicety with which time can be ascertained and compared between two well regulated time pieces. It greatly lessened labor and refined results. The next and last step has been made by yourself, who, also, are an ex-officer of the Navy; for I cannot forget the fact, that a portion of your early manhood and prime of life, was devoted to the service of your country, in this honorable and glorious branch of the public service.

You have, by your invention, eliminated from the problem the errors arising from comparing the face of one clock with that of another, and made it as easy and as practicable to divide seconds into hundredths, as, before, it was to divide minutes into seconds.

By your invention, you enable the Astronomer to make the ticks of his clock here in Washington, to be heard in St. Louis, or wherever the Telegraph leads, or may lead, and you make the clock to divide those seconds into hundredths, with as much certainty and accuracy as with rule and compass, I can subdivide an inch of space.

I have written the Secretary of the Navy a letter, giving him an account of this great discovery, and have requested that he will authorize one of your clocks to be procured for this Observatory, to serve as the great Central Magnetic Clock of the country, in perfecting its geography, by determining differences of Longitude, etc.

In the mean while, please give me some clue as to the time and money it would take to convert one of our Astronomical clocks, into a Magnetic clock.

You have done so well, that I think it but fair I should give you an opportunity of putting the finishing stroke to your invention, by making an improvement in it,—and I think you can,—which shall effect what I have long, but in vain, desired to accomplish.

As soon as I took charge of the Observatory, the importance of having a well regulated clock to break the circuit, and, thus, through the magnetic wires to drive all the clocks in the building, suggested itself as a great desideratum. I have never given the subject much investigation, but have left it as an *agendum* for some more convenient season; contenting myself in the interim, by wishing that somebody would invent the necessary contrivance. I think you have done it, though not exactly in the way that I was thinking of, yet in a much better way.

Our operations here, you know, are mainly directed to a catalogue of the stars. We have undertaken to penetrate with our instruments, every point of space in the visible heavens, and to catalogue every object that our instruments can reach. Five instruments, having three clocks and a chronometer between them, are continually at this work. So many clock rates to look after, makes the work of reduction exceedingly laborious. Now what hinders that the registering apparatus of your clock may be so contrived as to record, without confusion, and at the same time, the observations from all these instruments?

Can you not so arrange it? If you can, you will enable every observer to do with less labor and more accuracy, about twice the amount of work that he can now do; and you will enable the National Observatory to produce one of the most complete catalogues of the stars that has ever appeared.

Pray let me hear from you in reply, and say if it would be agreeable to you to make a visit here, by invitation of the Navy Department, for the purpose of affording me an opportunity to consult further with you about the clock.

Very truly your friend,
M. F. MAURY.

Lieut. Maury to the Secretary of the Navy.

NATIONAL OBSERVATORY,
Washington, January 5, 1849.

SIR:—I have the honor of making known to you a most important discovery for astronomy which has been made by Dr. Locke, of Ohio, and of asking authority from you to avail myself of it for the use and purposes of this Observatory.

The discovery consists in the invention of a magnetic clock, by means of which seconds of time may be divided into hundredths with as much accuracy and precision as the machinist, with rule and compass, can subdivide an inch of space.

Nor do its powers end here. They are such that the astronomer in New Orleans, St. Louis, Boston, and in every other place to which the magnetic telegraph reaches, may make his observations, and, at the same moment, cause this clock, here in Washington, to record the instant with wonderful precision.

Thus the astronomer in Boston observes the transit of a star as it flits through the field of his instrument, and crosses the meridian of that place. Instead of looking at a clock before him, and noting the time in the usual way, he touches a key; and the clock here subdivides his seconds to the minutest fraction, and records the time with unerring accuracy.

The astronomer in Washington waits for the same star to cross his meridian, and, as it does, Dr. Locke's magnetic clock is again touched; it divides the seconds, and records the time for him with equal precision. The difference between these two times is the longitude of Boston from the meridian of Washington.

The astronomers in New Orleans and St. Louis, and every other place within the reach of the magnetic wires, may wait for the same star; and as it comes to their meridian, they have but to touch the key, and straightway this central magnetic clock tells their longitude.

And thus this problem, which has vexed astronomers and navigators, and perplexed the world for ages, is practically reduced at once, by American ingenuity, to a form and method the most simple and accurate. While the process is so much simplified, the results are greatly refined. In one night the longitude may now be determined with far more accuracy by means of the magnetic telegraph and clock, than it can by years of observation, according to any other method that has ever been tried.

It is, therefore, well entitled to be called a most important discovery. It is a national triumph, and it belongs to that class of achievements by which the most beautiful and enduring monuments are erected to national honor and greatness; and my feelings of professional pride will not allow me to pass it by, without calling your attention to the garland that is thus woven for the navy.

To the navy belongs the honor of having first applied the magnetic telegraph to the determination of longitude. Five or six years ago, Captain Wilkes, of the navy, used it for determining the difference of longitude between this city and Baltimore. This was the first time it had been applied to such a purpose, and it was a great improvement upon the methods which up to that time had been used for finding the longitude, for it reduced the results down to the accuracy with which the time between the ticks of the second-hand could be measured on the face of the clock by the eye and the ear. And thus the honor of being the first to convert the magnetic telegraph into an astronomical instrument, and that too into one of great practical value and importance, was secured by one of its officers to the American navy. Though the errors of the problem were greatly reduced by this discovery, there were, however, small sources of error still remaining, and it remained for Dr. Locke, formerly an officer of the navy also, to devise a means of eliminating them so completely that now there is scarce a trace left in the results, so free are they from doubt and uncertainty. The probable error of longitude determined with Dr Locke's clock is brought within such narrow limits, that if, while the astronomer in St. Louis or elsewhere, were operating with the magnetic clock here for his longitude, the observer in Washington were to move from one instrument to another in this building, and make an observation with the latter, the fact that he had moved would be made known at once; and whether he had moved to the east or the west would be told by the clock, and appear in the resulting longitude.

Dr. Locke was formerly a member of the medical corps of the navy, and as such, spent a portion of his manhood and the prime years of his life at sea.

It is, therefore, not surprising that sailors should be quick to lay hold of the problem of longitude through any improved means that may be offered for its solution. Every one can see the importance of accurate determinations of longitude, but sailors both see and *feel* it. In his letter to me, describing his clock and giving an account of its performance, Dr. Locke kindly offers to put one in this Observatory.

It would be of incalculable service and advantage. It would increase the accuracy of results, and greatly multiply them in numbers. With this clock, one observer could do more and better work than two can now. An illustration of the value of such a clock just now occurs. I am writing at night, the sky is very clear, and it is the first fair night for observations that we have had this year. The wind is very high, and the observers have just come in to say they cannot hear their clocks, on that account; and therefore they cannot observe. Now, it is not necessary to hear, or even to see, the magnetic clock; and had we one, we could work quite as well in windy as in calm weather. While, therefore, one of Dr. Locke's magnetic clocks would be of such value to the Observatory, it would without at all interfering with that value, be of incalculable advantage to the public generally; for wherever in any part of the country there is a transit instrument, and a line of wires, this clock may be used by the observer at that instrument, not only for recording his observations, but also for determining his longitude from the capital of the country; and thus it would, without additional cost or trouble, enable the National Observatory to perform a most important part of its appropriate duties, and a most acceptable service to the world in perfecting the geography of the country, and in affording so many well-determined points of departure for the traveler, the surveyor, and the navigator.

Respectfully,

M. F. MAURY,

Lieut. United States Navy.

Hon. JOHN Y. MASON,

Secretary of the Navy.

Dr. Locke to Lieut. Maury.

CINCINNATI, *January* 10, 1849.

MY DEAR MAURY:—I cannot but be delighted with your letter; for two reasons; first for the cordiality, and secondly, for the clearness of discernment in entering into the spirit and intention of my invention.

When you say that I have "eliminated from the problem the error arising from comparing the face of one clock with that of another;" you name a point which had been perfectly clear to me, but which few or none, besides yourself, appear to have appreciated. You express a desire that one clock should be so arranged that it should move isochronously all the other clocks of the Observatory.

This is easily done. My clock would not only work the distant registers, but at your suggestion, I have already invented the arrangement by which the same clock would, without embarrassment, move all the other clocks in the Observatory. And further; In order to avoid the confusion arising from a multiplicity of observations entered on the same register fillet, each of the secondary clocks could have *its own register and fillet*, with an independent circuit, permitting each observer to enter his observations on a clean fillet, appropriated to his work alone; and yet the registration of *time* be *identically isochronous* with all of the secondary clocks, because it would be the work of one and the same clock. As the long circuit is not unfrequently interrupted or interfered with by the atmospheric electricity, I would work the clocks by a *local circuit*, requiring only one or two battery cups to sustain it.

Thus I have solved, intellectually, the interesting problem that you suggested, and I stake my reputation upon its complete success in practice.

I should be pleased to superintend the construction and modification of Galvanic clocks for your use, and so to arrange them as to answer your purpose at the National Observatory. But I am poor and rather advanced in years; I have a numerous helpless family for whom I feel it a duty to provide something in future; and therefore I could not come without such a compensation as I think the circumstances indicate. I cannot say what it would cost to attach the electrical machinery to your clock, for the work, as a National one, should be first-rate. There should be jewelling wherever it would be needed, &c., &c. I would rather devise, and have executed, a complete clock, than to modify one already made, still the latter is practicable, and the cost would not be such as a great National affair ought to regard. I have had executed here such temporary machinery as would test the practicability of the thing, and the cost, including my own time, has been about $180.

How would it do to memorialize Congress for a special appropriation for this thing, provided there are now no funds available?

In a few weeks I shall be disengaged from college duties, and could then proceed immediately to Washington, if my services should be required there. I do not know that I mentioned to you the invention of a key for star signals or observations which will give a *measured* break or blank. From the specimen sent you, you perceive that the automatic registration of time, is as near a continuous line as possible, and permits legible breaks, thus *purposely* reserving breaks or blanks; the only character perfectly available at all points of the circuit, for the observation signal. The commencement of a break is the *punctum* of the observation. But this might happen within the little break between two seconds, when it would be indefinite to the extent of that little blank. To obviate this, I have been obliged to have the break of a definite length, and such that if it commenced in a break, it must end in the line. The place of the end, minus the duration of the break, would then be the commencement or point sought. I have just finished a neat instrument of this kind, which by the touch of a key, like a flute key, makes a break on the fillet, and terminates in half a second. I think one of your clocks could have my electrical or telegraphic apparatus adjusted to it, in from one to two months, there being workmen in Philadelphia capable of doing it, but it could not likely be well done without my constant superintendence.

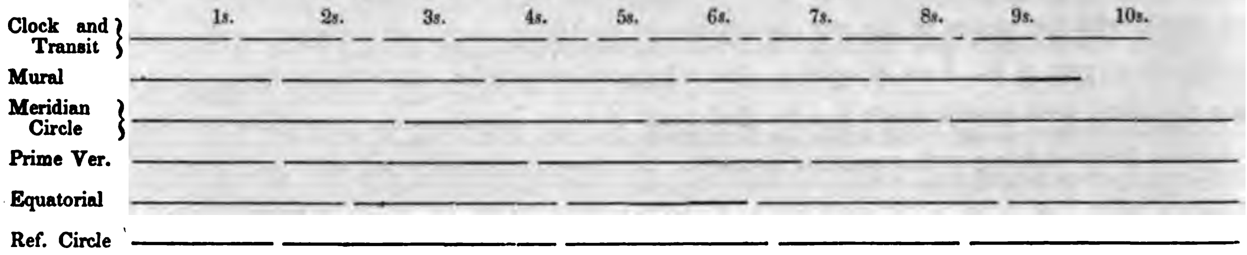
Lieut. Maury to Dr. Locke.

Observatory, Washington, *January* 20, 1849.

Dear Doctor:

We have been discussing a cylinder here; but it appeared to me the fillet would be ***practically*** the most convenient. However I am ready to strike under to you in all such matters. I rather hope that you will not publish a full description, as to details, &c., of your invention, before you get here, for I think, with a little discussion over it, we shall have it complete. Do you know I am doubting whether it will not be found more convenient in practice to have one clock, and do all the registering on one fillet, instead of having one clock to drive all? Let me explain: I have here 6 instruments requiring time:—what a glorious thing your clock will be for the Prime Vertical Transit Instrument and stellar parallax—we can have almost any number of wires in the diaphragm, and so multiply observations and refine results.—

But to go on: we have six instruments to register time for: can not your one clock be made to register separately for each instrument at the same time, and keep each account separate? can it not be done in this way? Suppose you give each instrument a connection with the registering apparatus, and have the records made side by side, and in lines parallel to clock line. Thus:



The breaks between the seconds on the first line, are the observations with the Transit, as with you; the breaks in the Mural line are the observations with the Mural; and the distance of these breaks from the pencil mark will give the fractions of seconds, and so with all the other instruments which break their lines on the fillet only at observations. The lines intended to be represented by those in pencil, may be ruled perpendicularly across the fillet, and then each square answering to a second, may also be subdivided into 0.04s, by oblique ruled lines, and so the subdivision of inches into 0.01 as on a common Gunter's scale; and all these lines across the fillet may be ruled beforehand. If you object to breaking lines for the other instruments, you might make them record by dots only; in that case it would be necessary to rule the fillet horizontally also; and to let the Mural for instance make dots between two red lines; the Meridian Circle between a red and a black, the Prime Vertical between two blacks, and so on.

Do you see any difficulties in the way of this? and if not, would not such an arrangement be more convenient and less troublesome, than the plan of one "clock to drive all?"

You ask me to put down thoughts, this is one of them; use it freely, and let it go for what it is worth.

The Secretary of the Navy sent you an invitation yesterday to come on. I hope you will. Harper says he can have the gravity escapement done in three or four months.

Yours truly,

M. F. MAURY.

Lieut. Maury to Dr. Locke.

NATIONAL OBSERVATORY, *January* 26, 1849.

DEAR DR:—

I saw the Secretary of the Navy upon this subject to-day. He promised to decide the question for us to-morrow. Your letter to him complicates the affair: it brings things to light which neither he nor I dreamed of. You will understand me, I am sure, and appreciate the remark when I say I don't wish, and do not intend to do anything which is calculated to mix myself or the Observatory up in any controversy in which you may find yourself involved about the clock. I want one for the Observatory. I think it would be of immense value to us in imparting accuracy and multiplying our observations. The clock that you have invented, I believe to be the best thing (of its kind) for astronomical work that has ever been devised, and so believing I desire to have one placed here as soon as it is possible to do it; and until I am satisfied that a more perfect one, and one which will answer my purpose better, shall be offered from some other quarter, I shall go for this one. I want the best, and the best I intend to have, *if I can get it.*

Your letter, requesting the semi-withdrawal of the one to the Secretary, had not reached him when I first saw him to-day. I made known to him what you wrote to me, and requested him in your name, as you desired, not to take any action with regard to your letter, until he should hear from you. He said he was glad of the request and would comply.

From the Navy Department I went to see Mr. Vinton. Mr. V. said he did not understand from your letter what was the price set by you upon the clock you invented. I told him I supposed the price set upon one of your clocks was comparatively small; that I had already authority to get one, and that the real value in the matter was the *invention.* That your labor and time had already been bestowed upon that in a ten-fold degree greater than any which you would now bestow in superintending the construction of one of the clocks for the Observatory; and, that I supposed you expected Government, if it used your clock, not only to pay what the mechanic would charge for making it, but also pay you for its invention. Now in the emergency of the case, and in ignorance of what you would consider fair and reasonable, I shall propose $10,000.

I am to see the Secretary of the Navy to-morrow. If he will not write to Mr. V. upon the subject, I shall. This letter will be by him laid before his committee next Tuesday. If the committee will instruct him to do so, and not without, he will include the sum above named, or any other that the committee will authorize, in the Navy appropriation. I consider your invention worth more; ten times the sum named would be cheap for it, but I do not think a larger sum would pass. Now if the course I propose do not meet your wishes, say so, by telegraph, and I will right it as far as it can be righted.

Your invention is one that benefits governments or nations and not individuals. It is like improvements in cannon or any other implement which is used by Government, and not by individuals for private advantage; and therefore I think the Government, if it use your clock, is in honor bound to pay you, not the mere cost of the article, or a *per centum* on your outlay, but to acknowledge the service you have rendered your country and the world by your invention, and pay you for that.

I hope you have not published me about the 'Fasicles,' for the idea was suggested to me by a remark of Mr. Keith, one of my assistants, to the effect that by having the wires all at different intervals, broken transits might be noted.

With regard to your proposition to make not only the clock, but the instruments also, I am satisfied. I called at the Telegraph office on the 23d inst., and after some little difficulty in making Mr. Vail (who I regard as a very clever and gentlemanly person) understand what it was I wished to accomplish, he eventually agreed with me that there would be no difficulty about it; and now I think that your clock wants but one more improvement to make it *perfect*, and that is that the star itself, when it is on the wire, shall "touch the trigger" and so put its own face down.

I write in some haste, for in the city of distances, all my time has been taken up to-day between the Secretary of the Navy and Mr. V.; and I now (9 P. M.) have to bring up my correspondence for the day, which is quite voluminous, and which will probably occupy the officer of the day all *night* to copy.

Yours truly,

M. F. MAURY.

Dr. Locke to Lieut. Maury.

CINCINNATI, *January* 26, 1849.

MY DEAR MAURY:—Yours of the 20th is received: with regard to your problem I think it would not do well, although the theory is all true. The register would be too heavily taxed, the fillet would tear, and the projection of the Zero lines across the paper would involve errors. But, Eureka! Eureka! Eureka! it can be done in another way; the secondary clocks are not needed, and the primary clock can supply time registration to all of your observers, who can each have his own fillet to himself.

The invention is a glorious one, but don't let out too much of it, for I have learnt a lesson. I regard this last as not inferior to my former invention.

Can you get the Secretary to report this invention upon your authority without the details as being of great economical value, for it will revolutionize the whole of practical astronomy? The Observatory can dispense with all of its present clocks, &c. &c., and use his influence to have such a bill as is talked of passed. I will consider an appropriation, should it be a moderately liberal one, as covering this invention and its application to public use. You say the Secretary had sent me an invitation, &c. It is not yet received. If it does not come to-day, I will inform by telegraph. I am half crazy with this new idea. Your time will be a unit, emanating to all the instruments from the same sources, with no intervening machinery. The affair is now reduced to, I think, extreme simplicity. I shall study to reduce it further if possible; but I do not think it is. I am alive to the idea of seeing the National Observatory the best in the world, for as soon as the idea is got hold of in Europe, they will all follow. They have got to do it, or be behind the age. I think I shall appear in the Intelligencer, look at it. If it is necessary that the Secretary should have reference with regard to my character, let it be made to Judge McLean, now at Washington, who has been a fellow-citizen for some 20 years.

Yours,

JOHN LOCKE.

Lieut. Maury to Mr. Vinton.

NATIONAL OBSERVATORY, WASHINGTON, *January* 27, 1849.

SIR:—Dr. Locke has been invited to come to Washington for the purpose of having one of his clocks put up for the use of the Observatory.

This instrument will be of incalculable value to the public service, for it is one of the most valuable astronomical instruments of the age.

Like the discovery of some simple means by which with a little attention a single lantern might be made to light an entire line of sea-coast, this discovery of Dr. Locke's is calculated to benefit the State and the world rather than individuals; and like the supposed discovery, it is of that class, the value of which to the world cannot be expressed by money.

Dr. Locke has been informed that his travelling expenses, &c. to Washington would be paid; this is all that the law allows. But when the case is considered in its true light, it will be perceived that the labor and trouble involved do not consist in coming to Washington and superintending the construction of the clock. The great labor was in the original invention, and has already been incurred.

The invention, as before remarked, is one for which there will be no demand by individuals sufficient to remunerate the inventor by the sale of patent right. In view of all the circumstances of the case, and considering the great value of the invention to the public, I recommend that $10,000 be appropriated to pay for the erection of the clock at the Observatory, and for the use to the Government of the invention.

Yours truly,

M. F. MAURY.

HON. SAMUEL F. VINTON,
Chairman of the Committee of Ways and Means,
House of Representatives.

Lieut. Maury to Judge Mason.

NATIONAL OBSERVATORY, WASHINGTON, *January* 27, 1849.

DEAR JUDGE:—At Dr. Locke's request, I saw Mr. Vinton yesterday, in relation to pay for his invention.

The Committee of Ways and Means will have the Navy Bill before them for final action on Tuesday.

Mr. V. requested that I would see you in relation to the Doctor's case, and if you were not disposed to write Mr. V. upon the subject of remuneration, he requested that I would, saying, at the same time, he would much prefer that you should. * * * If, however, you would rather not write him, please let my letter go to him with or without your written approval, as you may think best. I need not say I would be glad to have it go, if at all, with your official stamp.

Yours truly,

M. F. MAURY.

Lieut. Maury to Mr. Vinton.

NATIONAL OBSERVATORY, WASHINGTON, *January* 27, 1850.

DEAR SIR:—I was not able to procure an interview with Judge Mason to-day. I therefore send my letter through him for such endorsation or other action in the matter as he may think the case deserves.

Allow me to suggest $10,000 as the sum to be proposed. I might with as much propriety and with as much reason name $50,000, for the one sum would be as near the true value of the invention as the other. I propose $10,000 because I think it more likely to pass.

Respectfully, &c.

M. F. MAURY.

HON. SAMUEL F. VINTON,
Chairman of the Committee of Ways and Means,
House of Representatives.

P. S. What gives additional strength to this claim is the fact that the Government will probably never want but one of these clocks, for one here can be used whenever the Government wishes to have longitude determined by Magnetic Telegraph.

M. F. M.

Lieut. Maury to Dr. Locke.

NATIONAL OBSERVATORY, WASHINGTON, D. C., *January* 30, 1849.

DEAR DOCTOR:—The enclosed tell their own story. If the sum named is not satisfactory, you have *yourself* to thank for being indefinite. Moreover, I sent you a telegraphic message yesterday, asking if that would do. *I* suppose it will. I said you ought to be here *now*. I do not know whether you have taken out letters patent. If not, your enemies have but to get some M. C. when your item comes up and say, "Dr. Locke has no patent right; the invention is disputed; it is not the business of Congress to decide between the parties;" and so your appropriation will be killed dead.

Immediately after sending you the plan for the registering of all the instruments, the idea occurred to me, that it would be better to have a separate pen for the transit also, and so have the clock pen for clock purposes *only*.

But I considered the idea, as being there, and so thought its suggestion not worth the ink and time. The advantage of having the clock pen to itself would be the convenience of marking better, thus: your first 10″ might be thus:

——— ——— ——— ——— 5″ ——— ——— ——— ——— ——— 10″ and so on,

or any other way of making different marks for every 10″ or 15″. Then it would be more convenient to count one observation when you touch the key, and another when you take your finger off, thus: Transit

——————— 1 wire 2 wire ——————— 3 wire 4 wire ——————— and so on; in this way your clock will tell you—and at the same time *record* it—the interval from wire to wire without the trouble of subtraction. Now then, if we have one side of the fillet glazed, like the face of a visiting card, and the pens ever-pointed lead, silver or gold pens, we shall have clear, bright and smooth marks, with very little pressure and no fear of tearing the fillet. To save your pens from wear, they may be so arranged, that those for the instrument will make marks only while the finger is on the key.

For the convenience of cataloguing, you know I have several wires in the micrometer diaphragm which are horizontal. In one instrument I have 3, in another 5, in another 7, and in another 10 horizontal wires.

Now, as a check, it would be easy to make your clock with a separate pen for each instrument, *count* the *Mic. wires also.* Thus, a star comes, and is observed for Dec. on the 3d Mic. wire: as I finish noting the transit over as many wires as I please, I make as fast as possible three dots, thus: ... The end of the observation would then appear on the fillet thus: 1w ———— 2w 3w ———— 4w 5w ———— 6w ... which would prevent the possibility of a mistake in case two stars should follow each other at an interval equal to that between the two systems on which they happen to be observed. Suppose the next star that comes be observed on the 1 Mic. wire, which is in the lower edge of the field, No. 3 being in the upper, your check then will show whether the vertical wire be truly parallel; and if not parallel it will show you their inclination; you can make it tell also whether they be vertical, and if not, how much they are inclined. Besides this, your clock, I say clock "for *short*," I mean your combination of clock, Telegraph, Register, &c., will be a check upon the stability of instruments. Thus, in the catalogue, part of the field of the transit is common to the Mural also, because the Transit gives the Mural its Zero for R. A., and the Mural gives the Transit its Zero for Dec. Now suppose after the work for the night begins, the M. should change its level, azimuth, &c., as no doubt it frequently does, without detection, the fillet would show the time about which the change occurred. The two pens are side by side, and when the first star was observed, suppose the two instruments to differ 1″ in A. R. *observed*, but when the last star during the night is observed, suppose they agree: look back for the stars that are common, and the fillet will show when the change took place, whether *per saltum*, or gradually, during the night.

I have thus briefly alluded to some of the surprising and beautiful powers to be achieved by your great invention; as I said before, its powers are such, that you have only to invent a contrivance, by which the star itself, as it makes the transit, shall touch the key; and astronomers may then, for the first time, boast of *one perfect* instrument.

Yours truly,

M. F. MAURY.

P. S. I have a plan for making your clock do all the registering for the catalogue, both for A. R. and Dec., and so dispense with all lights in the observing room, except those for lighting the instruments; no time

Dr. Locke to Lieut. Maury.

CINCINNATI, *February* 5, 1849.

DEAR MAURY :—

Yours is received. I have taken out no patent, but I have filed a caveat. * * *

The caveat includes the Eureka, with proper historical acknowledgments of course. I am under such a pressure of business and excitement that I can't write so fully as I ought. * * * *

Most cordially yours,

JOHN LOCKE.

Lieut. Maury to Dr. Locke.

OBSERVATORY, WASHINGTON, *February* 10, 1849.

DEAR DOCTOR : — So far, your clock and the $10,000 go on well. They are in favor; and the appropriation has passed the House. It is now before the Senate. Go on, you have got what no one else has; and I take this occasion to say, as great as are the improvements which have been made to your original idea, your invention cannot be *perfect* until you come here, consult, *see* and *feel* what it is we do want; for I find that the man who makes an instrument and the man who uses it have very different ideas as to what and how the instrument should do. As an illustration, I have made alterations, and for the better, in every instrument in the building. I am sure "Eureka" can be made to do all the recording.

Respectfully, &c.

M. F. MAURY.

Lieut. Maury to Dr. Locke.

NATIONAL OBSERVATORY, WASHINGTON CITY, *February* 15, 1849.

DEAR DOCTOR :—Generally when I have been writing to you, I have written in haste, and have failed to make a suggestion which has more than once presented itself, and which has been regularly put back into the inkstand for the purpose of being hauled out in my next.

I was reminded of it to-day by the heading of the piece in the *Cincinnati Gazette* of the 11th, which you sent me; you there call it the "Time Scale Magnetic Clock;" this I think is a decided improvement upon the old name "Magnetic Clock." I think there is a great deal in a name : would not the *Magnetic Chronograph* be still better, or perhaps the micro magnetic chronograph or the electro-micro-magnetic chronograph, or some name, the simpler the better, that would be more descriptive of your invention, than clock?

Magnetic clock startles people who have invented such things; moreover your invention is not an application of magnetism to a clock, but rather the application of a clock to electro-magnetism. Your invention, or the chief merits of it, is in the minute subdivisions of seconds. This is your field. No one has entered it before you; and had it been so stated at first, there would have been in the public mind no apparent conflicting claim between you and the inventors of clocks driven by magnetism, or beating seconds through the aid of magnetism. Your clock is a time-writer, and it writes time, with the aid of Magnetic Telegraph; and if it were not for the euphony of the jumble, the magnetic telo-chronograph would be as nearly descriptive of it as any other *jumble* that you can fall upon, for the thing does so much, it is difficult to compress its powers in a name.

Before you christen it regularly, will you think of a better name?

I think *I see the way* clearly of making the recording apparatus with one fillet for all the instruments, and one pen for the clock alone, do all the recording without the possibility of a mistake in the mic. readings, and I am not prepared to say that in printing our observations hereafter, it will not be best just to take that slip, cut it up in suitable lengths for the page, and print that instead of figures for the instrumental readings, &c.; of course I do not mean literally to print the fillet, but to print it with its marks and dots, and observations, &c., all on a reduced scale. Our volume of astro-observations would then look not unlike a piece of music; except near the margin of the right hand page for instance, there would be three columns of figures containing the magnitude of the star, and the resulting R. A. and Dec., and I am not sure but what magnitude may go down also upon the fillet. However, it is quite time to think up these things when we get to work, and find out what physical or other difficulties may be lurking in the way.

As far as I can judge, everything looks favorable to you with Congress.

Your recording apparatus for ordinary work, as for cataloguing, should, I think, run the paper out at the rate of at least ¼ an inch a second; but it should have a governor, by the use of which it would run several inches per second, to be used on special occasions, as, for instance, in the determination of Long. by Mag. Tel.; Observations with prime Vertical, &c.; but experiment and the experience to be acquired by practice can alone determine as to these points.

Respectfully, &c.

M. F. MAURY.

Senator Corwin to Lieut. Maury.

SENATE CHAMBER, WASHINGTON, *February* 16, 1849.

DEAR SIR:—You have no doubt seen or heard that the House of Representatives have given Dr. Locke $10,000 for the use of his clock, &c. &c.

The Naval Committee in the Senate I learn have reported an amendment to the Naval Appropriation Bill, striking out that clause, I desire very much to have your opinion of Dr. Locke's claim and the utility of the clock. I have known Dr. L. too well and too long to believe him a pretender in any thing, until I have proofs more satisfactory than the suggestions of others, who seem to have the ordinary motive of selfishness to lead them astray. May I beg your reply as above, at your earliest leisure.

Truly your friend,

THOMAS CORWIN.

Lieut. Maury to Mr. Corwin.

NATIONAL OBSERVATORY, WASHINGTON, *February* 17, 1849.

SIR:—I am this morning in receipt of yours of the 16th inst., in which you request my opinion as to Dr. Locke's claim, and the utility of his clock.

I consider Dr. Locke's invention as one of the greatest improvements of the age, in practical astronomy. Other persons have invented "Magnetic Clocks," but all those clocks, as far as I know, beat seconds, and leave the Astronomer precisely where he was before, as it regards the sub-division of seconds.

He had by them, as with other clocks, to trust to the eye and the ear for the division of seconds. It was a great desideratum with astronomers, and an important matter for the world, to obtain the means of subdividing the seconds of time with accuracy and certainty; for a second of time, in the determination of Longitude, is equal to a quarter of a mile.

Dr. Locke took up this subject where others had left it, and by means of an attachment to a common clock, by the aid of electro-magnetism, and a common registering apparatus used in Telegraphic offices, devised the means of sub-dividing accurately and with precision, seconds of time into hundredths, or even into thousandths, if need be.

He has chosen to call his invention a "Magnetic Clock." I think that is rather a misnomer; for a clock to be driven by magnetism, instead of by weights, has been invented in England. That is truly a magnetic clock; and Dr. Locke's attachment or contrivance for sub-dividing seconds, may be connected with the magnetic clock as readily as with any other. At any rate, without going into the fitness of terms, the expression "Magnetic Clock," is not descriptive of Dr. Locke's invention. But as a practical illustration of the value of Dr. Locke's invention, I may mention the fact, that we have for four years been making observations here continually, for the purpose of determining the Longitude of this place. After we shall have been at work for twice that time—I might say for a life-time—if we succeed in determining the Longitude of the Observatory within the limits of the lot in which the building stands, 17 acres, we should consider ourselves as well repaid for the labor and time employed.

Now, with Dr. Locke's invention, the difference of longitude between this Observatory and any other point, reached by Magnetic Telegraph, may be determined in one night so closely, as to show in what part of the building the observations were made. And thus, by having one of Dr. Locke's clocks here, this Observatory may be connected with every other Observatory in the country in such a manner as to make all their observations for *their* Longitude from Greenwich or other European Observatories, available for determining *our* Longitude also from the same places.

It will enable the Observatory in a single night to determine the difference of Longitude between the Capital and any other place, reached by Magnetic Telegraph, with far more accuracy than can be done without it, and thus enable this Observatory to fulfil, in the most satisfactory manner, one of the most important objects of a National Observatory, viz: that of perfecting the Geography of the country, and of affording in different parts of it well and accurately determined points of departure for the traveller, the surveyor, and the navigator.

It will enable the observers now employed here to do double, perhaps treble, the quantity of work that they now do, and to do it better.

The instruments require five clocks;—with Dr. Locke's improvement applied to one of them, all the others may be dispensed with.

I might go on in the enumeration of the advantages to the public service, the facilities and the powers which this invention will give the astronomer, were I at liberty to explain principles, and give descriptions of the invention in its present state; suffice it to say, that ingenuity has been successfully exercised to such an extent in the matter, that, though there be six astronomical instruments here, one of these clocks will record the observations of all at the same time, and the record will not only show separately the work of each instrument, but if the observations be interrupted by clouds or any other cause, as they frequently are, it will show upon what wire in the telescope the star or other object was at the time when the observation was so interrupted. In view, therefore, of the importance and practical value of this invention, I consider that Dr. Locke has been as modest in his claims as he is with regard to his own merits.

Respectfully, &c.,

M. F. MAURY.

Senator Hunter to Lieut. Maury.

SENATE CHAMBER, *February* 28, 1849.

To Lieut. M. F. MAURY.

DEAR SIR:—I write to ask if you have any evidence of the ability of Dr. Locke to construct or superintend the construction of such a clock as you recommend for the Observatory?

I will be obliged to you for as early an answer as may be convenient.

Yours, very respectfully,

R. M. T. HUNTER.

Lieut. Maury to Mr. Hunter.

NATIONAL OBSERVATORY, WASHINGTON, *March 1st*, 1849.

SIR:—Your letter of the 28th ult., asking if I have any evidences of the ability of Dr. Locke to construct or superintend the construction of such a clock, as I recommend for the Observatory, was received this morning; and in reply I have to say that I have evidences which, to me, are entirely satisfactory. These evidences are derived from the following facts and circumstances: 1st. From Dr. Locke's character as a man of science and ingenuity. 2d. Dr. Locke has invented a clock, (not a "Magnetic Clock," but a clock known as his "Gravity Escapement,") which has been constructed by Harper, of Philadelphia, who has sent me an account of its performance for several months. It surpasses, in regularity of rate, any of the clocks in this Observatory; of which there are four, by the most celebrated European makers. This fact furnishes evidence that Dr. Locke is familiar with clock-work and clock machinery. 3d. The fact that the electro-magnetic circuit can be made and broken by a clock is well established. Clocks to do this have been set up in various parts of the world. 4th. No one who has seen the operator in our Telegraphic offices making and breaking the circuit, and thereby causing his registering apparatus to make lines and dots on a fillet of paper, as it rolls under the pen, can doubt, if a clock were substituted in place of the operator to make or break circuit every second, but what we should have measures of the length of paper which passed under the pen during every second of time beat by the clock; and that we should thus obtain on the paper a linear measure expressive of a second of time; and that by subdividing this linear measure, supposing it to be an inch, into tenths and hundredths, we should have the means accurately of dividing seconds of time into tenths and hundredths also. *This is the germ of Dr. Locke's invention.* 5th. It is equally evident that an operator may make this pen make other marks on the same paper while it is also marking seconds for the clock.

Thus while the clock is making marks like those on the enclosed slips at 1^s, 2^s, 3^s, 4^s, and so on, if an observer touch a key at the moment of observation, which moment may occur several times while the clock is making a line as per slips, (used only for illustration,) he will cause the pen to lift up and make marks as at *a*, *b*, and *c*, between 1^s & 2^s, 3^s & 4^s, 6^s & 7^s, and so on; and then, to know the precise instant, to the fraction of a second, when the observation was made, the observer has but to measure the distance of this break from the beginning or end of the seconds marked by the clock. 6th. And, therefore, I have the evidence of my own understanding that a clock to do what I have proposed can be put up, and I know of no one who is better, or even as well, qualified as Dr. Locke to superintend the erection of it.

Respectfully, &c.,

M. F. MAURY.

On the 7th December, 1849, we commenced to observe with the Chronograph, much to the delight and satisfaction of the observers. The only desideratum now felt, being some more convenient plan than any yet devised and tried for recording the observations; for all these plans: fillet, cylinder and clock, have their practical inconveniences, which, though they do not amount to difficulties, are nevertheless not so convenient as they would be, did they not require so much of the observer's time the next day, to read off the observations and enter them in his hand-book.

For further explanation as to certain parts and principles of this machine, I refer to Dr. Locke's Report to me, dated January 1st, 1850, and received April 4th, of the same year; as per the following letter:—

Lieut. Maury to Secretary of the Navy.

NATIONAL OBSERVATORY, *Washington City*, *April* 4, 1850.

SIR,—I have the honor to transmit herewith the report of Dr. Locke, partly in manuscript and partly in print, concerning his Electro-chronograph, which, by the act of March 3, 1849, he was authorized to erect for the Observatory. This instrument quite equals expectations, and no astronomer who may hereafter witness its operations, will consider the furniture of his observatory complete without an Electro-chronograph.

It has been applied to many uses and purposes that were not contemplated at first, and it is theoretically applicable to others to which it has not yet been applied. To some of these your attention was directed by my letter of 21st of February, 1850. I have suggested others as *agenda* to Dr. Locke, who, though he has done all and more than the act of Congress of 1849 required at his hands, continues, with great zeal and liberality to devote his time and means, not only in constructing, improving, and perfecting all parts of the machinery but also in all matters connected with the convenience of the Observatory, and the accuracy of the results. The law required him to construct his "Magnetic clock," as the Electro-chronograph was then styled, *at* the the National Observatory; and this he might have done, in a few minutes, with the help of a gimlet, a bit of wire, and a globule of mercury no larger than a pea; but with his characteristic liberality, he has constructed and mounted a most beautiful clock, and at his own expense has provided everything in the most complete manner connected with the registering apparatus.

He has never hesitated to condemn any part of the machinery to which the least objection has been made and to substitute new and improved therefor, but he continues to devote his time without further charge, to the still further improvement of that which he has already done, and which has proved so satisfactory. It is a question whether the registering apparatus itself may not be driven by the clock; and more important still, Dr. Locke has voluntarily offered to apply his clock in such a manner to the large Equatorial as to give it "clock motion." Should he succeed in this as well as he has done in other respects, he will afford science another boon of which astronomers will be glad.

Very respectfully, &c.,

M. F. MAURY.

HON. WILLIAM BALLARD PRESTON,
Secretary of the Navy, Washington, D. C.

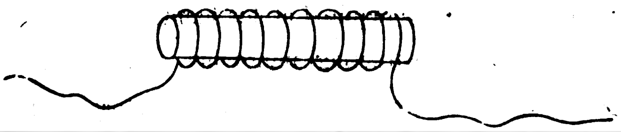
The following, together with the plates and diagrams, are extracted from that Report:

"It has been stated that dry electricity produces conspicuous effects, such as attraction and repulsion, when accumulated and confined by non-conductors; but when it is discharged through conductors, it passes instantly, showing phenomena much less remarkable, and ordinarily not noticeable.

"But the electricity of the galvanic battery, on the contrary, produces its most decided effects when it flows in a stream along the conductor, or rather as I have described it, when it revolves around the closed circuit, the battery being a part of it; and shows only a very feeble trace of electrical action, when that circuit is broken in the slightest degree; even a film of metalic tarnish, inconceivably thin, being sufficient to stop the electric motion. While the electricity is thus revolving around the circuit, be it ever so long, certain effects are capable of being produced at any part of it, and may be repeated or multiplied indeed along the whole line. Amongst these effects is the production of magnetism in soft iron, giving rise to a department of Physics, called Electro-Magnetism. Although this production of magnetism was not discovered in this country, yet some of the most prominent laws and properties of the Electro-magnet were ascertained and investigated by Prof. Henry, at Albany.

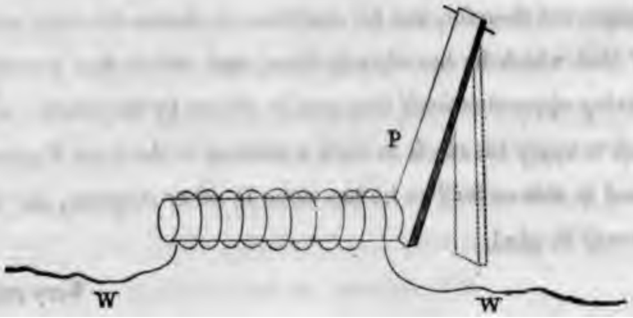
"When a conductor, as a wire, is wound spirally round a piece of soft iron, as in the figure below,

Fig. 1.



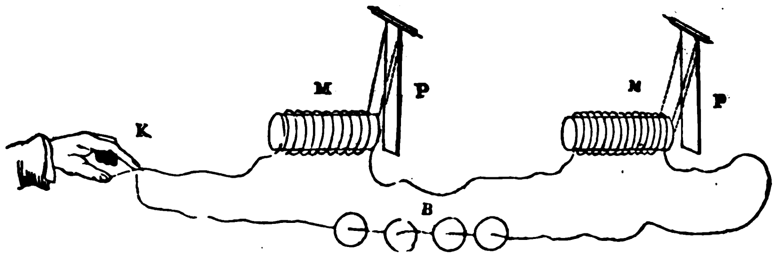
that iron becomes a powerful magnet the moment the hydro-electricity begins to flow along the wire, and ceases to be a magnet as soon as the electricity is interrupted by breaking the circuit or otherwise. If there be a piece of soft iron placed near the magnet, and free to move, it will, during the magnetic excitement, caused by the electricity, be attracted and moved towards the magnet as below,

Fig. 2.



in which P represents an iron pendulum, drawn forcibly into the position represented, when the electricity flows through the wire W W, but which will fall back into the first position, represented by dotted lines, when the electricity is interrupted. Here it is seen that an operator at any distance on the circuit can command a motion and power at a distance by means of a motion, at his station, so simple as the laying of one wire upon another, and removing it, an operation which closes and breaks the circuit, and thus moves or interrupts the electricity; even more—he has this power at any number of places along the circuit where magnets may be inserted. This is shown in figure 3 below.

Fig. 3.



"In this figure K represents the circuit broken by one wire being lifted from the other; B, the battery; M M, Electro-magnets; P P, their armatures in the position of the broken circuit; but let the hand at K drop the one wire upon the other, and instantly both the iron pendulums at P, will be drawn into the dotted positions.

"Such then, is the simple element of Prof. Morse's Telegraph, and such the elements of its parts, which I have by no means attempted to represent in actual form, but merely in such form as to communicate the general ideas.

"Suppose now the vibrating or reciprocating pendulum P, (Fig. 3,) to have a style or point P, which when drawn up to the dotted position, will have a strip of paper drawn forward under its pressure, by means of a local train of wheels, called a Register, or a Registering-machine; and we see plainly how the distant operator has the power to make dots, lines, or blanks, on that moving strip of paper of such number and length as he pleases. For while he closes the circuit at K, the pen is drawn against the running fillet of paper at P P and creases it visibly until the wire at K is again lifted, when the power ceasing, the pen falls back, and the blank paper passes forward. Thus may be generated the following characters:

Fig. 4.

. . . . . .   ——— ——— ———   ———— ———— ————

or any other that depend on blanks, dots, and lines, of all varieties of length.

"The circuit is closed in actual practice by an appropriate apparatus, called a key, and broken by means of a spring to the key itself. Thus the touch of the finger causes a line or dot according to duration; and the removal of it permits a blank on the fillet, which is supposed to move continuously, with a motion nearly uniform.

"If the reader does not understand the preceding brief explanations, he will please admit the well-known fact that an operator at any one station A, can, by touching one wire upon another, cause a style or pen at any other telegraph station, B, to press upon, and mark, a moving fillet of paper; and that by lifting the same wire from the other, he can discontinue that marking. Or, in other words, that the style or pen at B will be moved up or down on the paper just as the operator at A, moves the wire in his hand up or down. Consequently the operator at A, has command of these reciprocating motions, or of the pen, at B, and can control them at his pleasure.

"Another method of producing a controlable-electrical effect through extended conductors, is used by Mr. Bain. It dispenses with the mechanical power of the Electro-magnet, and substitutes a chymical agent by which it generates a line broken into dots and lines with intermediate blanks, the same in general as those used in Morse's Telegraph, described above. Instead, however, of the mechanical reciprocations by the Electro-magnet, the pen or style which must be of iron or steel, is in continual contact with a moving fillet of paper, moistened with a chymical liquid, susceptible of change of color, by electrical agency. The result is that while the circuit is closed and the electricity revolving, a blue, ink-like line is generated, but interrupted the moment the circuit is broken, or the flow of electricity by any other means prevented. All this does not change in the least the manipulations of the operator or writer, but only the mode of registering or recording his work. It will be evident in the sequel that either of these modes of recording or imprinting the electrical interruptions, may be adopted in the Chronographic operations of the clock.

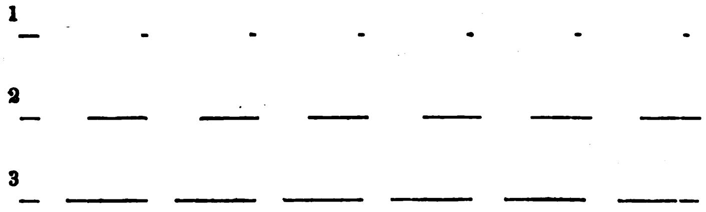
Clock Interruptions of the Circuit.

"It is evident that the movement of a clock may be made alternately to break and close the electric circuit, instead of the hand of the operator, and this mode of interruption has been used in Europe since about the year 1840, for the purpose of causing Electro-magnets at a distance to vibrate an armature,* and by that means to impel any number of distant secondary clocks to move simultaneously with the primitive or interrupting clock. Arrangements of this kind have been made by Professor Steinheil, by Mr. Bain, and by Professor Wheatstone. But none of them, so far as can be learned, has ever used the clock interrupter for the purpose of printing the units of time, and for inter-printing at the same time the records of observations of passing events; nor were the clock interrupters invented by them capable of being used for that purpose.

"I propose in this paragraph," says Dr. Locke, "to give an abstract or intellectual description of my Chronograph, reserving the special description of its mechanical arrangements for a separate article.

"The reader, who is supposed to have acquired a knowledge of the elements of Electro-telegraphing, just described, will perceive that by substituting a clock interrupter instead of the operating telegrapher, there will be generated in the registering machine carrying the paper fillet, a species of character of great uniformity, which will consist of dots, short lines, or long lines, and short breaks, according to the duration of the contact, and the supplementary duration of the break, exhibiting the following modifications:

Fig. 5.



"Besides the clock interrupter, or the clock alternately making and breaking the circuit, I introduce into the same circuit, at any other point of the same, a hand-key, either for making or breaking the circuit, but used by me mostly for breaking the circuit.

"This is like a flute-key, and by its spring, generally keeps the circuit closed, but by touch that circuit is broken, and continues so till the finger is removed.

"This constitutes the simple key. But another modification called the Metrotome key,† is so constructed, that after a momentary touch it holds the circuit open for a given time, say one-half of a second, and then closes it, without any special attention from the operator.

"Thus it appears that the circuit is cut by two interrupters, the clock and the key; and it should be observed, while that circuit is broken by one of them, the other can produce no effect, for when a circuit is broken in one place, its use as a circuit is, for the time being, nullified, and no electrical effect, either positive or negative, can be produced by its means. On account of this condition, there is, under ordinary circumstances of a single battery, a single circuit and a single clock, an evident necessity that so far as the clock is concerned, the circuit should be kept as nearly closed as possible, in order to leave the metrotome key in a condition capable of efficient action. I have therefore for Longitude operations, adopted such a clock interrupter, as will generate the time-scale No. 3, in the above figure, but for the work of a local observatory, other time-scales may be used.

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*Armature is a technical term applied to the piece of iron which a magnet attracts. It is sometimes also called the Keeper.

†Metrotome meaning that which measures a break or interruption.

"I invented almost immediately the Reverse Register, or rather it was suggested by my son, Joseph M. Locke.

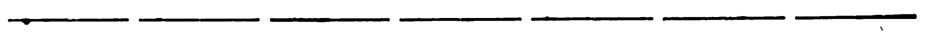
"By means of this reverse contact which may be introduced either in the local or receiving magnet, the pen or style makes its mark while the circuit is broken, and runs a blank while it is closed. In the Observatory Chronograph, just erected, it is effected by means of the contact of the receiving magnet, and by such mechanism, that while the clock interruptions are unchanged, and continuing to be the slightest possible, the circuit being *almost continuously closed* agreeably to the fundamental condition, the registering can be changed from lines to dots instantly, by touching an extra stop or key on the receiving magnet. Thus the operator may use at his option, scales 3, or 1, in the above figure; when he uses scale 1, his observation marks will be positive lines instead of blanks.

"I am aware that by two batteries and a complicated system of interruption, a dotted time-scale may be used. In the sequel it will appear that I had invented a key, adapted to this use, but the more simple mode is preferable.

"Now, with a clear view of the revolution of electricity through the closed circuit, including in its course the battery, the clock, the break circuit key, and the registering machine, all of which are a part of the circuit itself, the following operations become intelligible.

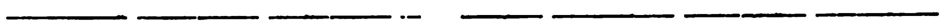
"The clock by its ordinary going, causes the registering machine to mark an interrupted time-scale, on the running fillet of paper, as in 3, Figure 5 above, or in dots as in 1, or as below:

FIG. 6.



each mark denoting a unit of time, say a second, which time-scale may be issued at any distance from the clock itself. The evident effect of touching the break circuit key, and thus interrupting the flow of electricity will be to cause an instantaneous blank in the time-scale thus:

FIG. 7.



"Here the commencement of this blank or break in the fourth line (Fig. 7) shows that the key was touched in the midst of a measured second, and about one-tenth part from its commencement towards its end. This fraction of the second can evidently be ascertained with as much precision as we are enabled to measure such an extension. The value of the fraction is not, however, supposed to be obtained by simply measuring the length of the single short line immediately before the blanks; but the length of the lines immediately preceding and succeeding the broken second, must also be measured, and the mean of the two must be used as a divisor into the short line, the quotient will be the fraction of the second at which the key was touched. Here then we have the means of recording very precisely, and with the facility of a touch, the exact moment of the occurrence of any event. As astronomical phenomena are of the utmost importance to be so recorded, the Chronograph has been applied to that use.

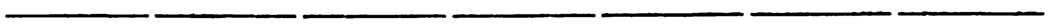
"The toothed wheel *e*, is attached finger-tight to the seconds hand arbor, and as it revolves, the teeth, 60 in number, trip the tilt hammer *t*, by acting on the jeweled verge at *m*, and thus cause the interruption at the insulated cylinder *o*.

"It is essential that the tilt hammer handle should engage the toothed wheel at an angle of 45° below the line joining the centre of action of the wheel and the hammer, in order that the motions of lifting the tilt hammer and escaping from its handle shall be equal. In some attempts to use my interrupter, the tilt hammer action was actually placed in the line of junction when the motion of escape was only the difference between the *radii* and the *secants*, which at this point is inconsiderable. The consequence was that the least error in the length of the teeth would cause a grave error in the lifting of the hammer. The brief direction is, that the tilt hammer handle should neither coincide with the tangent to the toothed wheel, nor be perpendicular to it, but at an angle of 45 degrees with it as in the figure.

"When the tilt hammer is at repose on the cylinder, the electricity which may be supposed to enter at the clamp P, passes along the insulated conductors *f* and *g*, enters the platinum pivot of tilt hammer *t*, running in platinum bushed holes, passes along the hammer and enters the platinum cylinder *o*, through a platinum point, thence it passes along the contact *l*, to the conductors *h* and *i*, to the other binder N, and thence by a wire to the battery. As the tilt hammer is tripped every second, the Morse's Registering machine would record seconds in a manner already described.

"If the toothed or electrical wheel be so adjusted, as to let the jeweled verge of the tilt hammer rest between the teeth during the current second and be tripped only suddenly at every escape, then the time-scale will be a line with slight breaks as below.

FIG. 8.



"But if it be so adjusted, by a slight turning of the wheel, that the jewel shall repose on the point of the tooth during the current second, and only drop between the teeth at the escape of the seconds or crown wheel, then the contact will be only momentary, and the time-scale generated will be dots as below.

FIG. 9.

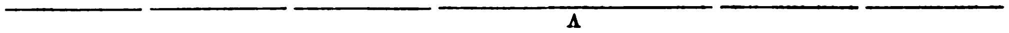
"Every intermediate grade of scale can be obtained by adjustment. Thus the clock is made to print or mark down SECONDS of time.

"*Of the marking of* MINUTES.

"One of the 60 teeth of the Electrotome wheel is cut off, and consequently at every revolution of the wheel, one break to indicate seconds is omitted, or on the dotting adjustment, a line would be produced as below:

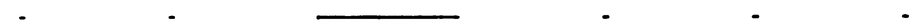
"*First, in the linear adjustment,*

FIG. 10.



where it will be seen at the caret a break is wanting; and the recurrence of this omission indicates the zero or commencement of the minute. In this manner are MINUTES marked on the time-scale fillet. 2d. In the dotting adjustment as below:

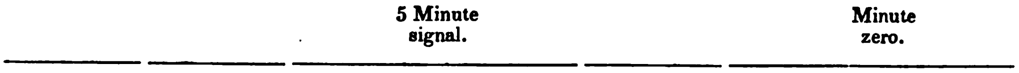
FIG. 11.



"Either the beginning or the end of this long line may be assumed as the minute zero.

"To mark every five minutes, an extra wheel had been introduced which is driven by the third wheel of the clock and revolves every five minutes. On the projecting arbor of this wheel is placed a socket, like that of the common clock hand to be crowded finger tight. From this socket projects backward a piece like a counterpoise to a hand and made fast to the socket. To this again is added the long index *v*, movable circularly around the centre, but with its short end bent up and entering a mortice *v'* in the fixed projection, just described, where it is adjustable by the two little thumb screws placed antagonists to each other at *v'*. Approximate adjustment is to be made by slipping the main socket, but the final more precise adjustment of the five minute pedal is to be made by the screw at *v'*. At the long end of this index is attached the pedal *p* like a foot to an ankle. At the lowermost point of the revolution of the five minute index, an arm in convextion with this pedal comes in contact with an inclined plane, and in the further progress of the index it flexes or lifts the pedal on its ankle joint, raising the toe upwards—finally the arm drops suddenly and lets the pedal fall upon the tail of a little tilt hammer *t'*. This hammer has its platinum anvil above it, and the circuit is thus closed between the conductors *j* and *k*, which it will be seen, are only branches of the two conductors *g* and *h*, or of *i* and *k*. This cut-off circuit, being thus closed, the electricity passes, during the continuance of the contact, and disregards the interruptions of the electrotome wheel *c*. A continual line will be the result on the time scale. This line can be adjusted to any part of the minute by turning the socket on the arbor—and it can be adjusted in its duration by a screw at *w*, which moves the inclined plane nearer to, or farther from the end of the five minute tilt hammer. I have preferred to fix this five minute signal to commence about four seconds before the minute zero and to continue two seconds, when the fillets will be marked thus:

FIG. 12.

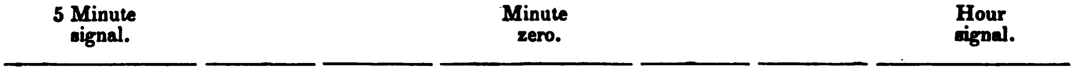


"It should be noted that the five minutes do not end exactly at the five minute mark, but are continued to the next minute zero; the minute zero being the zero of everything, the beginning of a second, of a minute, of a five minute period, of an hour, of a day.

"*Of the marking of* EVERY HOUR.

"This is done essentially in the same manner as the marking of every five minutes, the index and pedal being placed on the arbor of the wheel which revolves once in an hour, viz: the centre or minute hand wheel. The pedal is raised however by passing over a pin at *n*. This signal has been placed a few seconds *after* the minute zero, the 5 minute signal being *before* the same. At the beginning of every hour, then, the three several signals occur consecutively, thus:

Fig. 13.



the true commencement of the hour being at the minute zero.

"It should be added with regard to the electrical works represented in Plate I, that they are situated behind the dial, and in front of the main plate of the clock to which they are attached. They are insulated, as are all other parts of the registering machines, requiring it, by thin non-conducting laminæ interposed in metallic joints, the work having been made originally as if no insulation were to be used: I have used for that purpose thin laminæ of ivory, tortoise shell, split and flattened quills, and layers of mica. To insulate a piece screwed on, I place, say mica underneath it, bush the hole for the screw with a quill, and put under the head of it a collet of pearl.

"I am thus enabled to dispense with the instability of wooden bases and substitute brass plates. So far as I know this system of insulation is new.

"*Of the positions of the several Electrotomes in Plate* I, *in relation to time being recorded on the time-scale fillet.*

"The minute zero indicated by the deficient tooth x, has passed the seconds tilt hammer 5 seconds. The 5 minute pedal has dropped from the handle of the 5 minute tilt hammer, which by its counterpoise, has fallen from its anvil above it, and broken the circuit. The hour pedal has dropped from its elevation pin n, and is still on the tilt hammer handle at t, and of course the hour signal is being generated by the registering machine wherever it may be placed.

"Whenever the dotting method of indicating seconds is adopted by adjustment, the several signals above described will still be long lines as before.

"*An independent Electrotome for seconds.*

"An arm is screwed to the arbor of each detent, and running each horizontally about half an inch, turns off at right angles, and comes forward through a slit in the front plate in the form of a pivot at q q. Two light tilt hammers pivoted on platinum concentrically with the arbors, extend horizontally, and passing over these pivots, rest on the platinum beds of the two conductors *u u*, connected with the binding screws at the corners of the plate. The ends of these conductors act as free springs, and are adjustable by means of the screws *y y*, on which they rest. Now, as the detents are lifted a little at the extreme of every arc of the pendulum, these tilt hammers will be lifted by the arms over which they pass, and in their descent they will repay to the pendulum the momentum which they had borrowed by being raised.

"A circuit, including this apparatus, by screwing its wires to the two binders A and B, would record seconds. It is my own invention, and is the least objectionable of any pendulum Electrome known to me. It can be used at the same time with the toothed Electrotome, and will have certainly all the accuracy of the pendulum's motion. But I am so tenacious of a pendulum entirely unembarrassed, that I prefer the other method of operating, and I have accordingly left it detached from the pendulum.

"*Method of recording observations in the time-scale in such manner that the exact moment at which the observed phenomenon occurred, shall be marked down permanently on the time-scale fillet.*

"This is done ordinarily by means of the break circuit key, which being inserted into the circuit of wires at any place where phenomena are to be observed, is struck or tapped like a flute key at the punctum of time to be noted, where a blank is commenced in the midst of the time-scale, and continued until the circuit is restored, or the key is permitted to rise. The following is the appearance of the time-scale fillet, marked with observations properly interpolated into the time record. See Fig. 7, p. 27.

"In order to read this register or ascertain the value of the quantities, the seconds from some known point on the scale must be counted, and a fraction of a second just previous to the observation must be measured by any of the known methods of measuring extension and the whole second, or better the two whole seconds, contiguous to the observation must also be measured, and the first or fractional quantity must be divided by the half sum of the two seconds, and the quotient will express the true fraction of the second at which the phenomenon happened. The half sum of two contiguous seconds is used to avoid a frequent error of the clocks being a little out of beat. It is evident that the admeasurement of the lines on the fillet may be made either by the dividers and diagonal, plane scale and vernier, or angularly by passing the fillet around a cylinder and reading by vernier and micrometer.

"It will be observed that in using the dotting scale, observations involving the fraction of a second cannot be made, as the broken circuit will give no signal by breaking it again.

"It will sometimes happen that the observation break will commence somewhere in the midst of one of the little breaks between the seconds, and thus be rendered indefinite to a small extent. To avoid even the smallest error, a peculiar key has been invented, called the metrotome key, which records observations by means of breaks, which are of a measured time length, and thus enables the observer to calculate this observation from either the one end or the other of that break. * * * * *

"A very vexatious difficulty often presents itself in the operation of the Electrotome or Interrupter, the surface of the platinum becoming either oxidized by the galvanic action, or in some other way rendered a nonconductor, the work will sometimes cease to be performed.

"To avoid this, Prof. House, the inventor of the printing telegraph, suggested that some mechanism be devised by which the point of contact should be continually changed and the surface be continually wiped.

"Plate I, Fig. 2, exhibits the plan I have adopted for the purpose. It is the machinery by which the contact roller O, described in Fig. 1, is made to revolve spirally under the tilt hammer; A A, is the main plate of the clock; M, is a portion of the main wheel or barrel; *n n*, is a section of a thick toothed wheel, attached to the barrel, and having a rachet and click within itself.

"This wheel has 72 teeth, and engages and turns two other wheels, both moving separately on the common axis X X, one having 72 teeth, and the other 71 teeth, consequently, when the main wheel shall have turned once round, these two wheels *y* and *z*, will have changed their rotation to each other one tooth, and would not again come to the same position until 72 revolutions, a period of 36 days.

"The wheel *z*, causes the platinum cylinder O, to revolve with it, being both fastened to the same axis, and the wheel *y*, causes the cam cylinder *o*, to revolve with its own rate, being attached to the same tubular axis which includes the axis of *z*. This cylinder is grooved spirally, like a screw, half round in one direction, and again the other half round in the opposite direction, thus presenting what are called a left handed and a right handed thread returning into each other. A pin *i*, fastened by a kneed cock to the plate, enters this groove, and compels the cam and also the cylinder O, while they revolve, to have a longitudinal motion backwards and forwards, or as the figure lies, to the right and to the left. Hence, the contact of the tilt hammer point will touch the platinum cylinder successively in a spiral line, and as the relations to the cam are continually changing, it will not repeat the same track again, until 72 revolutions, and probably not even then, as the winding and the rachets will likely give to it a new starting point.

"The track described by the contact point on the cylinder will thus be a lozenged shaped checker-work like the thread of an old-fashioned bossed ball of sewing thread or a ball of twine. Underneath the cylinder O, is a leather wiper, pressed upward by a lever, and a weight attached to an arm as seen in Fig. 1, to the right of the cylinder O.

"If it be true as supposed by some, that the galvanic current actually transposes platinum from one pole to the other, as it does charcoal in the deflagrater, then the platinum cylinder should be made the accumulating pole, that the accumulated matter might be constantly wiped away.

"The Electrotome is thus, I hope, made to be a self-preserving machine. * * *

"Subsequent to my letter to Lieutenant Maury, several letters were exchanged and several problems proposed by him in reference to adapting the graphic mode of observing to the work of a local observatory.

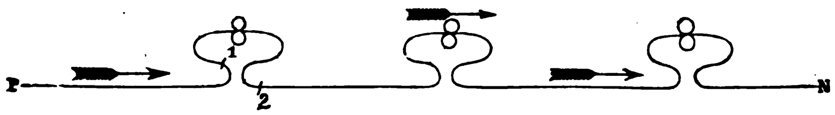
"To this subject I immediately turned my attention. One of the first problems proposed by him was to dispense if possible with a multiplicity of clocks, each of which required a different equation for its rate and reading, and still allow several observers in different rooms to record their observations by one common standard. After several plans had been revolved, the following was adopted:

"Let each observer have his registering machine, and let one clock send its time-scale to each of them, and let each observer have such a key that he can at pleasure turn off the electricity from his special register, without disturbing the time current in any of the other machines, thus enabling him to record by blanks his own observations, without disturbing those of any other observers, who can also be recording their observations all independently without the least interference. This not only enables the observers within the observatory to record independent and different observations in identical time-scales issuing from a single clock, but it enables any number of observers to any extent along the telegraphic line to use the time-scale of a central clock for registering each his independent local observations.

" Independent electro-observing with one common clock is effected in the following manner by "cut off" or circuit "switches," which at the moment they break out one local circuit, they close the broken ends to preserve a general current.

" The general arrangement is shown by the following diagram:

Fig. 19.



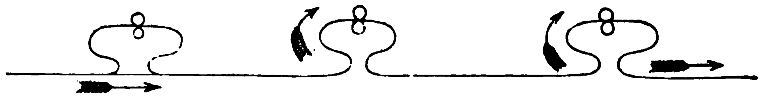
" Suppose the line P N to represent a part of the general circuit including a single Electrotome, clock, and a battery, besides the several registering machines, represented by the character 8. It is evident that each machine will issue the time-scale dictated by the clock, and that they will be generated as isocrynously as lightning and the action of such machines will permit.

" It is evident too, that if the observer at the first peninsular curve can instantly cut off the wire at 1, and join the lower end of it over at 2, the current will be stopped at the excluded registering machine, but it will still pass through the other two.

" A blank will of course occur in the first register, and this blank is the record of an observation.

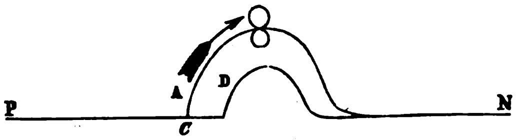
" Lest the general principle of the action here attempted to be described be not understood, I will present the figure as it would be after the cut-off change had been made at the first register, thus:

Fig. 20.



when it is evident that the main current is not interrupted while it has been turned off like a locomotive by a switch from the circuitous portion of the route, to travel more directly on the main track. But to do this properly, there must be no interruption as would happen by first a break, and then a joining of the circuit. This is to be accomplished by an arrangement illustrated by the following diagram:

FIG. 21.



"Let P, C, A, N, be a part of a circuit closed at C, by a spring contact; then let the flexible branch D, be forced downward upon the wire C, by which means the contact at C, will be broken, but not until the new contact at D, shall have been formed, as that is the cause of the break at C, and being the cause, it must precede the effect, though ever so briefly. The current after the change of contact would evidently be through the branch D, and the register in the branch A, would be running a blank in the fillet.

"The next step was to construct a convenient instrument for making those changes as in the last diagram, and at the same time measure the break, or in other words have the key so constructed that after being struck, it should hold the circuit open for a measured period, say half a second, and then restore it without special attention from the operator. I have named this key, rather from its last property, than its cut-off functions, and called it the Metrotome key."*

The key or catch, which stops or puts in motion the roller on which the fillet is wound, is connected with a magnet in such a manner, that, by restoring and breaking the circuit, the magnet is made to pull back or let go the catch, and of course, to stop or set in motion the fillet at the will of any observer.

The wires for such a circuit pass to each instrument, so that any observer can put the registering apparatus in motion, but he cannot stop it without the consent of all. The practice is, therefore, when one of the officers goes to observe, he restores the circuit which sets the fillet in motion first, before the observation commences, and breaks it when he is done; so that, if he only be observing, the fillet stops when he is done, and there is no waste of paper. If each one of the five instruments be at work at the same time, each observer, by unhooking the wires, breaks his own circuit when he is done. This, though, does not interfere with the motion of the fillet, so long as any one of the five circuits is in connection. Therefore the registering apparatus does not stop until the observer, who is the last to use it, breaks his circuit. The spring then carries the catch back, inserts it between two of the teeth in the wheel which revolves with the reel on which the paper is wound, and stops the machine. For this arrangement I am indebted to the ingenuity of one of my assistants, Professor Keith.

Every time the fillet is stopped, the observer notes in pencil on it the hour and minute at which any one of the even minute marks was made.

The next day his observations are taken off from the fillet, entered in his observing book, and when each observer has done the same, the fillet is properly rolled, labelled, and filed away.

It is not necessary that the fillet should move at a uniform rate under the clock pen during the evening, for every puncture made by the clock pen as it counts the ticks of the clock, is of itself an independent zero point, from which to reckon the interval between such zero and the puncture made by the observing pen during that second of time; but it is nevertheless desirable that the fillet should move at a uniform rate during each second of time. For instance: suppose that during the interval which elapses between the ticks which denote the first and second seconds of a minute be, when measured on the fillet, 1 inch; that the interval between the ticks which denote the fourth and fifth seconds be 1.1 inch; and that the observations occurred between the first and second seconds, and between the fourth and fifth. Now, it is immaterial whether the length of fillet that passed under the pen from the second to the fourth second be two inches or one tenth of one inch, or any other measure. All that is required is, that the motion of the fillet from the first to the second puncture should be at a uniform rate during that interval, and that whatever be the length between the fourth and fifth punctures, that the rate of motion during that interval should be also a uniform rate.

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* *Vide* Dr. Locke's Report.

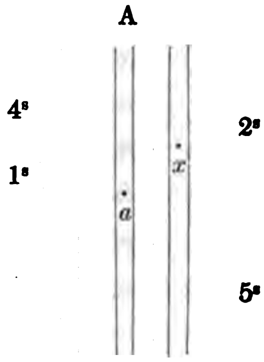
The fractions of a second are reckoned from the beginning and the end of the second of which the fraction is sought.

The usual rate of the fillet under the pen is about one inch per second, and the observations are read off by means of a transparent scale, a little less than one inch broad, and a little more than one inch long. This scale is divided into ten equal parts by parallel lines drawn in the direction of its length; if the interval between the second dots be greater, as it generally is, the scale is turned obliquely across the fillet, until the first and tenth divisions exactly comprehend the space between the two second dots.

This, therefore, is a sliding scale, which always subdivides the second's spaces into tenths, and enables the observer to measure with accuracy and facility—assuming uniformity of motion of the fillet for the space measured—the fractions of seconds to tenths.

Let A be the scale; suppose the distance from 1 to 2 represent the distance on the fillet between the first and second seconds, and that the dot x between them represent the observation. The scale is turned but little to cover this space, and it is seen at a glance that the observation was recorded at the dot x, or between 1.7 and 1.8 tenths of a second.

On the other hand, suppose the dots of the fourth and fifth seconds be as far apart as 4 and 5, and that the dot near a stands for the observation; we now see by the same scale that the observation was recorded between $4^s.4$ and $4^s.5$.



It is easy to estimate to tenths the distance of the puncture a or x from the nearest scale division; thus by this little contrivance we measure time accurately to tenths, and estimate to hundredths of seconds.

This invention of the electro-chronograph has enabled us to dispense with the eye and the ear in the comparing of the face of one clock with that of another; for the process of connecting with a battery-registering apparatus any clock having a metallic pendulum and works, is very simple. To do this, attach, if necessary, a small piece of metal to the back of the clock, and so place a globule of mercury on it, that the pointer, or pendulum index, which is generally used to denote the arc of vibration, may pass through the globule of mercury once every vibration.

Now, if we imagine the clock stopped:—the pendulum at rest, with the pointer in the mercury:—a wire from the battery leading to any part, as one of the brass plates, or one of the metallic screws which secures the clock to its case:—also, if we imagine another wire leading from the metallic support of the mercury to the registering apparatus, and then another wire back to the battery again:—it is evident that we shall have a circuit complete; for from the wire which leads to the clock-works there is a metallic contact through them down the pendulum and through the globule and its support, to the wire leading thence to the registering apparatus and back to the battery.

Now, if the pendulum be put in beat, it is evident it will break the circuit whenever it passes out of the mercury, and restore it again as soon as it touches it.

By this means the old west clock has been converted into a chronograph, and the mean time clock made to record its beats also with the chronographic pen; and thus compare itself with the astronomical clock or regulator.

On one occasion, when comparing these two clocks through an interval of several minutes, in order that the fillet should show the gain of a second between them, I observed that the completion of the gain happened so nearly at the instant when the pendulum of each clock was in the act of restoring the circuit, that but one of the pens made a dot; for each clock was then writing with a pen of its own on the same fillet.

One clock was in the east, the other in the west wing; the fluid took the shortest cut: and only the astronomical clock pen was moved.

Though I have frequently endeavored to repeat the experiment, I have never succeeded in again getting the two pendulums to enter the globule so nearly at the same instant, as to make but one dot, or move but one pen.

These two pendulums, mean time and sidereal, are not of the same length; they each passed through the globule of mercury at the lowest point in the arc of vibration; and consequently, when the motion of each pendulum was at a maximum.

Now it is clear, inasmuch as the two pendulums were moving at different rates, that if they entered each its globule of mercury at the same instant, one must have cleared its globule before the other; or if they cleared at the same time, one must have entered before the other, unless indeed the difference in the size of the globules had chanced to be—a possibility scarcely probable—exactly such as to compensate for the difference in velocity, and thus cause each globule to retain contact with the pendulum for the same exceedingly minute space of time.

The globule of mercury was in each case about $\overset{\text{in.}}{0.10}$ or $\overset{\text{in.}}{0.15}$ thick.

Now, how long does it require an index three inches long attached to the lower end of a pendulum vibrating seconds of sidereal time, to pass at the lowest point of the arc of vibration, and when the velocity of the pendulum is a maximum, through $\overset{\text{in.}}{0.10}$ or $\overset{\text{in.}}{0.15}$ of space; and how long does it take a pendulum vibrating seconds of mean time to do the same? And what is the difference between these two times? (Probably not more than one hundred thousandth part of a second.) For we know at the least, that *half* that difference is not time enough to restore contact, change circuit, pass the fluid, and move the pen.

We moreover know that 0.00137 of a second is more than time enough for this; for if two pendulums, one vibrating seconds of sidereal time, and the other seconds of mean time, be caused to make dots *electro-chronographically* on the same fillet, one pendulum will gain upon the other $0^s.00274$ each vibration, or $0^s.00274$ part of a vibration; and that, consequently, during that second of time when the ticks are nearest in coincidence, one of the pendulums must restore contact with *less* than $0^s.00137$ before or after the other.

We know, moreover, that when there are two circuits, a long and a short one, to and from the same battery, the current of electricity will give preference to the shorter. We have, moreover, seen that the two clocks, when put in connection *a la* electro-chronograph, will ordinarily continue to make dots each for itself, when the pendulums are passing coincidence. And we have seen also that the two clocks can restore circuit so nearly at the same instant, that the electric fluid will pass but one circuit.

And hence we have two spaces of time, a maximum and a minimum, discovered accidentally, one of which is more than long enough, and the other of which is not long enough to induce contact, to turn circuit, pass the electric fluid, send it a few feet to registering apparatus, and move the recording pen.

This accidental discovery as to the failure of the mean time circuit to pass its electricity on the occasion referred to, has suggested to me a series of experiments upon armature time, velocity of electricity, and other properties of the fluid, such as *vis inertia*, and the like; *if there can be such a thing as vis inertia to an imponderable.*[*]

For this purpose suppose two metallic pointers be attached to the same pendulum; that each pointer have its own globule of mercury with an independent circuit, and that these two pointers, as well as those two globules, lie in a plane normal to the plane of vibration. Now, if the two pointers be of the same length, and of the same size, and if the two globules be of the same thickness, and the pendulum be vibrated, it is evident that each of the two pointers would enter and leave each its own globule at identically the same instant, and that consequently each of the two circuits would together be opened and closed, and that if one of the circuits were longer, as it should be, than the other, the fluid would take the shorter cut, and we should have the pen of the long circuit to remain at rest while the pen of the short one would be recording seconds, or more properly, vibrations.

Now, suppose that one of the pointers, or one of the globules, be moved out of this plane by a certain determinate quantity, and that the pendulum be vibrated again. Now, knowing the distance of this globule, or the end of this pointer from the plane in which it originally stood, and knowing also the length of the pendulum and pointer, and the time of vibration, it will be observed that we should have theoretically by such a contrivance the means of subdividing a second of time almost infinitessimally, and with wonderful accuracy.

By gradually increasing the interval between the two contacts, we should finally observe the other pen begin to make dots also, and the interval measured with a micrometer between these two dots divided by the interval from one second dot to the other, would give the expression for the armature and pen time, and the time required to restore contact, change circuit, pass the electric fluid, &c.

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[*] If we were to have a short circuit of invariable length from one pointer, and circuits of variable length from the other, would not the duration of the interval between the times of each pointer's entering its globule, give an expression for the difference of the time during which the fluid would be traversing the short and the long circuit. In other words, if each circuit were the duplicate of the other as to length, &c., and if the two pointers were each to restore and break circuit at identically the same instant, would the fluid give

Having ascertained this time, the pen of the long circuit may now be connected with a circuit passing over the country and through a distance of great length. Thus may we be provided with a new method—but whether therefore a better, remains to be seen—by which we may ascertain the velocity of the electric wave or current.

Use has already been made here of the principle, which induces the electricity to take the short in preference to a longer circuit, when there be two or more.

In adapting a common astronomical clock to electro-chronographic purposes, we have availed ourselves of this principle to make the clock keep a record of its minutes by omitting a dot at the end of every 60ˢ.

For this purpose, a piece of metal about two inches in length was attached behind the face of the clock to the axis of the second hand. It was placed astride the axis, and neatly balanced, one end of the metal being a little longer than the other. It was so arranged that at the beginning of every minute, or at the completion of every 60ˢ, this long end would be in a globule of mercury from which the circuit to the battery is shorter than is the circuit from the globule through which the index of the pendulum passes; consequently, at the 60ˢ mark the pen remains still, makes no dot. This is also an arrangement for which I am indebted to the ingenuity of Professor Keith.

I am not, at this time, prepared to express an opinion as to the relative merits of the several plans of registration that have been proposed. They are all good as compared with the old method of eye and ear, and each one is a great improvement upon that. As to the final choice of methods by any Observatory:—that will depend very much upon the use to be made of the electro-chronograph, and the number of the observers employed. For when any piece of mechanism or machinery is continually to be used by a number of persons, it becomes important that it should possess the quality of not being easily deranged or put out of order.

The application of electro-magnetism to astronomical purposes is new. It is still open to extension, and to a great variety of improvements.

We can already perceive how it may be applied, *theoretically* at least, as a motive power to clocks, to give clock motion to telescopes equatorially mounted, and to drive the registering apparatus for recording astronomical observations.

By vibrating pendulums at different points on the earth's surface, and having them to record electro-chronographically their vibrations on the same register, we may also perceive how, *theoretically*, electro magnetism may be applied to measure the figure and density of the earth, the height of mountains, and the difference of density in the underlying strata at any two stations.

Pushing the *theoretical* applications of this new astronomical appliance still further, we perceive how, with the aid of electro-magnetism, we may also weigh the Moon and gauge the atmosphere.

Whether, when we come to the experiment, and essay to do these things, we may not find in our way practical difficulties too great for any ingenuity, however acute, to overcome, is another question and one as to which I do not at present pretend to offer an opinion.

But *theoretically* it is clear, that if two pendulums, duplicates of each other, be vibrated in free suspension, one for instance on the sea shore in Virginia, or at a known elevation above the Atlantic, and the other on the sea shore in California, or at a known elevation above the Pacific.—If I say two such pendulums were vibrated and made to record electro-chronographically each its own vibrations upon the same fillet, disc or cylinder, and if these two pendulums were made to change places, vibrate and record through a given time, as before, and long enough for one to gain or lose upon the other a given part of a vibration, we should obtain from their rate of gain or loss the data requisite to determine whether the level of the Pacific on the coast of California be identical with the level of the Atlantic on the coast of Virginia, and also, we should be enabled to determine the arc of the parallel of latitude between the two stations.

So likewise if the two pendulums were vibrated, reversed and vibrated at different stations near the same meridian, or one on a level with the sea and the other on the top of a mountain, the difference in the times of vibration, unless *concealed* by the practical difficulties which I do not propose here to discuss or consider, would enable us to determine the differences between the earth's centre and surface at each station.

The plan hitherto pursued here with regard to registration has been to use one clock, one registering apparatus and one fillet for all the instruments, only giving to each a separate pen.

The observations are not read off and entered in the observing book until the next day, and the observers complain that there is a loss of time and inconvenience in one observer having to wait until another be done with the fillet; each one seems to prefer an entire registering apparatus to himself on that account.

Before however the final arrangement as to this matter be determined, I wish to try other plans of registration, so that I may the better be enabled to form a correct judgment as to that plan which practically shall be the best.

The problem of using the Electro-chronograph clock to drive the Equatorial as well as the Registering apparatus, is under consideration.

This clock has been successfully applied to drive a skeleton clock in another part of the building. This skeleton consisted only of the face, *three* hands, three *toothed* wheels and three levers: one to drive the second hand wheel one notch a second or one revolution in sixty seconds; one to drive the minute hand wheel one revolution an hour, or one moment at the end of every sixty seconds; and the other to drive in a corresponding manner the hour hand.

This clock of course shows the time and repeats all the errors and rates of the parent clock.

The use of the Electro-chronograph has increased and refined the powers of the observer to such an extent as to make necessary many alterations and changes in the arrangments for observing.

It relieves us of the necessity, whatever be the number of telescopes at work, of looking after the rates and errors of more than one clock in the Observatory.

It imposes the necessity of re-arranging the diaphragms of all the telescopes, for there is no necessity of having the vertical wires of a transit instrument for instance more than 2^s or 3^s apart.

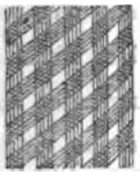
I procured from Mr. Wurdemann, on Capitol Hill, a new diaphragm for the West Transit Instrument having *two systems* of wires in it, which include seventy-five spider lines, viz: one system of vertical and one system of inclined wires. Each system is divided into groupes or fascicles of five each. The equatorial interval from the 1st to the 5th line of each vertical fascicle, varying from about 8s to 11s, (seconds of time).

In recording transits chronographically, and in observing the transit—now of one star over this fascicle, and now of another star over that, and then of a third over another of the fascicles, and so on, the fascicle observed upon, is afterwads identified by the interval between some two of the wires of each fascicle which is peculiar to that fascicle. Thus suppose the interval between the first and second wire of the first fascicle be 2s, and between each of the other wires 1s; of the second fascicle, suppose that the distinguishing interval be between the second and third wires and so on.—

Now having established the rule to observe every star over all the wires of at least one fascicle, it will be an easy matter the next morning or the next year to determine from the fillet the fascicle over which the star was observed. To complete a set of observations over any one fascicle requires only from eight to ten seconds.

The West Transit Instrument is used in the catalogue work as a differential instrument for *declinations* as well as a transit instrument. To adapt it for this purpose, after the electro-chronograph had been established, the old diaphragm with its system of horizontal micrometer wires was removed and a reticulated diaphragm substituted in its place.

The wires for diff. Dec. 35 in number, are inclined, about 45° to the vertical wires. The wires for diff. Dec. are also arranged into groups or fascicles of five each, and the intervals of some two or more of each group are so arranged as to designate the groups by having larger intervals than the vertical wires. It is, therefore, never possible to confound when reading from the fillet an observation for Dec. with one for R. A. But to make the distinction still more marked, the rule is to observe for R. A. first; then, by a telegraphic symbol, such as two or three close dots in combination with a line, and the like, to denote the magnitude of the star, and then immediately to observe it over a fascicle of inclined wires for Dec.



Annexed is a diagram of the diaphragm. Now it is evident that if the telescope be set, and if a star whose Dec. has first been observed by the Mural or Meridian Circle, be observed both for Æ and Dec. as it passes over this system of vertical and inclined wires, that we shall have from such star a zero point or a zero-line so long as the telescope remains fixed. This line is indeed invisible in the field, but it is evident that by observing every other star that comes, for both co-ordinates, we obtain the data for determining by a simple calculation how much above or below this invisible line every one of the stars so observed has passed.

Thus it will be observed that this diaphragm and the electro-chronograph afford us the means of recording and preserving in invisible but determinate lines, arcs of the parallels of declination of all the stars that pass through the field and are observed.

JAN. 1, 1850.*

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*The proper date of so much of the Report as is addressed to Hon. Wm. B. Preston.

To Hon. Wm. A. Graham, Secretary of the Navy.

January 22, 1851.

The hydrographical duties of the office have commanded much of my time, and have received a large share of my attention.

Having been authorized so to do by the chief of the Bureau of Ordnance and Hydrography, whose enlightened policy with regard to all matters of hydrographical import, challenges commendation from all the friends of philosophical research, I employed George Manning, of New York; A. H. Bancroft, of Boston, and Capt. Daniel McKenzie, of New Bedford, an old experienced but retired whaling master, to procure from ship owners, retired sea captains and others, old sea journals; and to copy from each, the position of the ship daily in latitude and longitude; the force and set of the currents; the temperature of the air and water; the prevailing force and direction of the wind three times a day, or once for every eight hours; the height of the Barometer; the state of the weather; with remarks upon all subjects calculated to be of interest to the practical navigator.

For every day for which these gentlemen afforded such a record, whether in the Atlantic, Pacific or Indian Ocean, they were paid at a rate varying from one to two and a half cents per day's record.

In this way a large mass of materials for the Wind and Current charts was obtained. The copyists were required to note, also, in these abstracts whenever the appearance of whales was mentioned in the log.

With these materials on hand, the labor of collating them commenced.

It was made the duty of one set of officers to construct a series of charts, and of another set to project on those charts the tracks of the vessels whose log books were under discussion, and to describe by symbols the force and direction of the winds and currents daily encountered by each.

These charts are numbered A of the series. They are the "Track Charts," and have been published for the North Atlantic, in eight large sheets, and a part of the South Atlantic. The rest of the South Atlantic is in press; and the remaining numbers of this series, both for the Indian and Pacific oceans, are in process of construction. They are on a scale of 0.8 in. to a degree at the Equator.

The different sheets of this series show at a glance the frequented and unfrequented parts of the ocean; and inform the navigator as to the general character of the wind and weather, the force and direction of the currents encountered by those who have preceded him in the same part of the ocean, and at the same season of the year.

I have obtained* a list of arrivals at San Francisco from the Atlantic ports of the United States and Europe, up to the middle of December, 1850. Taking the shortest passage for each month by American, English, French and Dutch vessels, we find that the American vessels which arrived there after the shortest passage in May, June, July, September, November and December, had each these charts on board. Of the vessels thus furnished, the shortest passage was by the Sea Witch in 97 days, the average of the six being 114 days.

The shortest of the other six which did not have the charts was 119 days, and the average 128.

Mean average taking the shortest passage only for each month:

For American vessels, 122 days.
" English " 167½ "
" French " 182¾ "
" Dutch " 190½ "

The average passage of *all* the American vessels that arrived during the year is 187½ days, i. e. 73½ days longer than the mean of the 6 shortest passages with the charts on board; 59½ longer than the six shortest without the charts—20 days longer than the average of the 8 shortest by English; 4¾ days longer than the 8 shortest by French, and 3 days shorter than the mean of the 7 shortest passages by Dutch vessels.

These charts are highly prized by practical navigators, and are eagerly sought after by them.

This series as far as published is the work of Lieut. Whiting, Passed Midshipmen Wyman, Gibbon, Beaumont and Temple, and of Professors Flye and Benedict, all of the Navy.

Those marked letter B of the series, are illustrative of the trade winds and the regions of calms and monsoons contiguous thereto. They are constructed according to a peculiar system of engraved squares.

This series, published only for the Atlantic, shows that the N. E. trade winds occupy a belt or zone extending in length from East to West across that ocean, having a variable breadth of from 17° to 35° of latitude. Its average mean breadth is about 23°; and in its extreme range it extends from 3° South to 35° North, according to the season of the year.

This zone makes two vibrations in a year. It reaches its extreme northern declination usually in September. Then returning and following the Sun, it reaches its southern extreme in March and April. Being stationary for two or three months, between 3° and 4° North it commences to return North, and in the months of August, September and October, its other stationary period, it is seldom or never found to the South of the parallel of 9° N. The parallel of 9° N. may be taken as the mean limit of the equatorial border of the zone of N. E. trades.

The S. E. trade winds occupy a similar zone in the South Atlantic, with a like vibratory motion. The mean equatorial limit of this zone instead of being near the parallel of 9° South, to correspond with the zone of the Northern hemisphere, is in about 3° North.

It is a remarked phenomenon, discovered in the course of these investigation, that the S. E. trade winds blow with more force than do their congeners of the Northern hemisphere. They have force enough to push the latter with their belt back towards the North, intruding occasionally in the late summer and in the early fall months as far as the parallel of 9° North. Whereas, out of many thousands of records examined, it does not appear that the belt of N. E. trade winds is ever found to cross the parallel of 3° South.

The two zones of winds are characterised by a like difference of strength in the Pacific. The S. E. trade winds of the Atlantic ocean have force enough to push their equatorial limits over into the Northern hemisphere, and to keep them there during the greater part of the year. The reverse is never the case.

The prevailing direction of what are called the N. E. trade-winds is, as nearly as the observations which mariners usually furnish, enable me to determine, about E. N. E.

By resolving the forces which it is supposed are the principle forces that put those winds in motion, viz: calorific action of the Sun and diurnal rotation of the earth, we are led to the conclusion, that the latter is much the greater of the two in its effects upon the trade winds of the Northern hemisphere. But not to such an extent is it greater in its effects upon those of the Southern. We have seen that those two opposing currents of wind are so unequally balanced that one recedes before the other, and that the current from the Southern hemisphere is larger in volume; i. e., it moves a greater zone or belt of air. The S. E. trade winds discharge themselves over the Equator; i. e., across a great circle into the region of equatorial calms; while the N. E. trade winds discharge themselves into the same region over a parallel of latitude, and consequently over a small circle. If therefore we take what obtains in the Atlantic as the type of what obtains entirely around the earth, as it regards the trade winds, we shall see that the S. E. trade winds keep in motion more air than the N. E. do, by a quantity at least proportional to the difference between the circumference of the earth at the Equator, and the circumference of the earth at the parallel of latitude of 9° N. For if we suppose that those two perpetual currents of air extend the same distance from the surface of the earth and move with the same velocity, a greater volume from the South would flow across the Equator in a given time than would flow from the North over the parallel of 9° in the same time; the ratio between the two quantities would be as rad. to the sec. of 9°. Besides this, the quantity of land lying within and to the North of the region of the N. E. trade winds is much greater than the quantity within and to the South of the region of the S. E. trade winds. In consequence of this the mean level of the earth's surface within the region of the N. E. trade winds is, it may reasonably be supposed, somewhat above the mean level of that part which is within the region of the S. E. trade winds. And as the N. E. trade winds blow under the influence of a greater extent of land surface than the S. E. trades do, the former are more obstructed in their course than the latter, by the forests, the mountain ranges, unequally heated surfaces and other such like inequalities.

As already stated, the charts show that the momentum of the S. E. trade winds is sufficient to push the equatorial limits of their northern congeners back into the Northern hemisphere, and to keep them at a mean, as far North as the 9th parallel of North Latitude. Besides this fact, our investigations also indicate that while the N. E. trade winds, so called, make an angle in their general course of about 23° with the Equator (E. N. E.), those of the S. E. make an angle of 30° or more with the Equator (S. E. by E.) I speak of those in the Atlantic: thus indicating that the latter approach the Equator more directly in their course than do the others, and that consequently the effect of the diurnal rotation of the earth being the same for like parallels, North and South, the calorific influence of the Sun, exerts more power in giving motion to the Southern than to the Northern system of Atlantic trade winds.

That such is the case in nature is rendered still more probable from this consideration: all the great deserts are in the Northern hemisphere, and the land surface is also much greater on our side of the Equator. The action of the Sun upon these unequally absorbing and radiating surfaces in and behind, or to the North-

[illegible] probably tend to retard these winds, and to draw large volumes of the atmosphere [illegible] by them, back to supply the partial vacuums made by the heat of the Sun, as with intensity its rays upon the vast plains of burning sands and unequally heated land [illegible] hemisphere.

[illegible] that the influence of the land upon the normal directions of the wind at sea, is an im- [illegible] is frequently traced for a thousand miles or more out upon the ocean.

[illegible] instance, the action of the Sun's rays upon the great deserts and arid plains of Africa, in the summer and autumnal months, is such as to be felt nearly across the Atlantic ocean between the Equator and the parallel of 13° North. Between this parallel and the Equator the trade winds are turned back by the heated plains of Africa, and are caused to blow a regular Southwardly monsoon for six months.

This monsoon is a discovery which has been fully and completly developed by the charts and the investigations connected with them. They (the monsoons) blow towards the coast of Africa from June to November, inclusively. They bring the rains which divide the seasons in these parts of the African coast. The region of the ocean embraced by the monsoon is cuniform in its shape, having its base resting upon Africa, and its apex stretching over 'till within 10° or 15° of the mouth of the Amazon.

Indeed, when we come to study the effects of South America and Africa, (as developed by these charts,) upon the winds at sea, we should be led to the conclusion—had the foot of civilized man never trod the interior of these two continents—that the climate of one is humid; that its valleys are for the most part covered with vegetation which protects its surface from the Sun's rays; while the plains of the other are arid and naked; and for the most part act like furnaces in drawing the winds from the sea to supply air for the ascending columns which rise from its overheated plains.

Pushing these facts and arguments still further, these beautiful and interesting researches seem already sufficient almost to justify the assertion that were it not for the Great Desert of Zahara and other arid plains of Africa, the Western shores of that continent within the trade wind region would be almost, if not altogether, a rainless, sterile, and uninhabited district.

These investigations, with their beautiful developments eagerly captivate the mind; giving wings to the imagination, they teach us to regard the great deserts, the arid plains, and inland basins of the earth, as compensations in the great system of atmospherical circulation. Like counterpoises to the telescope, which the astronomer regards as incumbrances to his instrument, they are nevertheless necessary to give certainty and smoothness of motion;—facility, and accuracy to the workings of the machine.

The meteorological and physical researches with which the "Wind and Current Charts" are connected, relate only to the sea. Already the mariner has felt and acknowledged the importance of them. Commerce and navigation are reaping benefits from them of great moment; and American navigators, with that regard for the practical and useful which adorns their character and makes them renowned, have nobly stepped forward, and volunteered to co-operate with me in collecting facts for the further prosecution of the work. More than a thousand ships are now daily and hourly occupied in all parts of the ocean in making and recording, each a prescribed series of observations upon the winds and the currents, the rains, the calms, the storms, the thunder and the lightning;—the fogs, and clouds, and drift;—the temperature of the air and water; and all other subjects and objects, facts and phenomena, which are of interest to navigation and to science.

Each at the end of his voyage transmits to this office his "Abstract Log," as the series is called. Enough of these has already been collected to make two hundred large manuscript volumes, averaging each from two to three thousand days' observations, and the number is constantly increasing; indeed, the materials increase faster than I have force to discuss them.

When we travel out upon the ocean, and get beyond the influence of the land upon the winds, we find ourselves in a field particularly favorable for studying the general laws of atmospherical circulation.

Here, beyond the reach of the great equatorial and polar currents of the sea, there are no unduly heated surfaces, no mountain ranges, or other obstructions to the circulation of the atmosphere; nothing to disturb it in its natural courses. The sea, therefore, is the field for observing the operations of the general laws which govern its circulation. Observations on the land will enable us to discover the exceptions. But from the sea we shall get the general law. Each valley, every mountain range and local district, may be said to have its own peculiar system of calms, winds, rains, and droughts. But not so the surface of the broad ocean.

In this connection I beg leave to call the attention of meteorologists on shore to the importance of introducing a special column in their journals, to show what are the rainy winds at each station and for each season of the year.

Upon every water shed which is drained into the sea, the precipitation may be considered as greater than the evaporation for the whole extent of the shed so drained, by the amount of water which runs off into the sea. In this view, all rivers may be regarded as immense rain gauges; and the volume of water annually discharged by any one, as an expression of the quantity which is annually evaporated from the sea, carried back by the winds, and precipitated throughout the whole extent of the valley that is drained by it. Now, if we knew the rain winds from the dry for each locality and season generally throughout such a basin, we should be enabled to determine, with some degree of probability at least, as to the part of the ocean from which such rains were evaporated. And thus, notwithstanding all the eddies caused by mountain chains, and other uneven surfaces, we might detect the general course of the atmospherical circulation over the land as well as the sea, and make the general courses of circulation in each valley as obvious to the mind of the philosopher as is the current of the Mississippi, or of any other great river, to his senses. That river so abounds with eddies, that it is difficult to tell by regarding small portions of its surface only, which way the water is flowing. But when we come to regard the drift wood and the whole river, we are left in no doubt as to the onward course of the main stream itself, with all its eddies and whirlpools. They are all bound down to the sea together with the general mass of waters.

These investigations shew that the vapors which supply the sources of the Amazon with rain are taken up from the Atlantic Ocean by the N.E. and S.E. trade winds.

They show that the trade-wind regions of the ocean, beyond the immediate vicinity of the land, are, for the most part, rainless regions; that the trade-wind zones may be described in a hyetographic sense as the evaporating regions.

They also show, or rather indicate as a general rule, that, leaving the polar limits of these two systems of winds, and approaching the nearest pole, the precipitation is greater than the evaporation, until the point of maximum cold is reached.

They also seem to indicate as a *general* rule, that the S. E. and N. E. trade winds which come from a lower to a higher temperature are the evaporating winds, i. e., they evaporate more than they precipitate, while those winds which go from a higher to a warmer temperature, are the rain winds, i. e., they precipitate more than they evaporate. That such is the case, these charts indicate; and reason tells us it is so.

The results of these charts therefore suggest the inquiry as to the sufficiency of the Atlantic after supplying the sources of the Amazon and its tributaries with their waters, to supply also the sources of the Mississippi and the St. Lawrence, and of all the rivers, great and small, of North America and Europe.

A careful study of the rain winds in connection with the "Wind and Current Charts" may indicate to us the "springs in the ocean" which supply the vapors for the rains that are carried off by those great rivers.

"All the rivers run into the sea: yet the sea is not full; unto the place from whence they come thither they return again."

Pardon this digression. It is my duty to give an account of what has been done at this office, and not in this place to speculate upon what might be done. It is better to report facts and give results than to speculate. But the field in which we are engaged is rich with promise. And it is due to the large corps of observers who are co-operating with me gratuitously and *con amore*, that I should state in a formal manner, not only what the fruits of those labors actually are, but what promise they give of future harvests, and thus encourage them to go on with their labors, with the assurance that the prospects before us justify the belief that important discoveries in the great laws which give circulation to the atmosphere and direction to the winds, and set to the currents, are beckoning us on.

Returning now to the trade winds of the Atlantic.—There is between the two systems, a region of calms, known as the equatorial calms. It has a mean average breadth of about six degrees of latitude. In this region the air which is brought along to the equator by the N.E. and S.E. trades ascends.

These calms cover a region of constant precipitation, and this region vibrates up and down the ocean as a zone or belt, as the trade winds vibrate. In the summer months it is found between the parallels of 8° and 14° of N. latitude, and in the spring between 5° S. and 4° N.

By this chart the navigator can tell what places within the range of this zone, have, during the year, two rainy seasons, what one, and what are the rainy months for each locality.

Were the N. E. and the S. E. trades with the belt of equatorial calms of different colors and visible to an astronomer in one of the Planets, he would by the motion of these belts or girdles alone, tell the seasons with us.

He would see them at one season going North, then appearing stationary, and then commencing their return to the South. But though he would observe that they follow the Sun in his annual course, he would discover that their extremes of declination are not so far asunder as the tropics, though in certain seasons the changes from day to day are very great. He would observe that these zones would linger near each of their tropics about three months, and that they would pass from one of their tropics to the other in a little less than another three months. Thus he would observe the whole system of belts to go North from the latter part of May till some time in August. Then they would stop and remain stationary till winter, in December; when again they would commence to slide down towards the South rapidly over the ocean until the last of February or first of March; when again they would become stationary and remain about this, their Southern tropic, till May again.

The zone of the S. E. trade winds would present its northern edge inclined somewhat to the equator: commencing near the coast of Africa and tracing the usual outlines of this edge over towards South America, he would discover that it approached the equator at an angle of about 15°; and he would announce that the equatorial edge of the zone of S. E. trades in the Atlantic lies W. 15° N. and E. 15° S.

Turning his attention now to the belt of N. E. trade winds, he would observe the equatorial edge of this zone to be somewhat, though not altogether, symmetrical with the equatorial edge of the S. E. trade wind zone of the other hemisphere. On the African side it is farthest from the equator, which it approaches at an angle of about 10° (W. by S.) until it reaches the meridian of about 40° West. Here it is deflected to the North and trends off in the direction of W. N. W. Here we begin to experience the effect of the North American continent upon the trade winds at sea. The rarefaction caused by the plains of northern Texas and the arid plains in that quarter, is sufficient in summer to convert the N. E. trades of the Gulf of Mexico into a prevailing wind from the Southward and Eastward.

In the Pacific and within a certain distance from the land, the N. E. trade winds are by the same influences converted into a S. W. monsoon.

By tracing on a chart the equatorial limits of the N. E. and S. E. trade winds, as herein described, it will be perceived that there is left between the two systems a wedge-shaped band having its broadest part on the African side of the Atlantic. The region of the ocean which the Planetary Astronomer would observe this band or belt to cover, is the region which is occupied by the equatorial calms and the African monsoons that fall between the systems of N. E. and S. E. trade winds. And were the belts which represent these calms different from the rest as to color, the imaginary astronomer would see it as somewhat of an irregular curve not having the northern and southern edges concentric. The concave side of this curved belt is turned to the E. of N. and has its centre near the shores of Greenland.

As before remarked, the newly discovered monsoons also come in with the equatorial calms and give the peculiar wedge-shaped form to the regions between the two systems of trade winds.

Having completed the physical examination of the equatorial calms and winds, if the supposed observer from some distant sphere should now turn his telescope towards the poles, he would observe a zone of calms bordering the N. E. trade winds on the North, and another, the S. E. trade winds on the South. These also would be observed to vibrate up and down with the trade wind zones, partaking of their motions and following the declination of the Sun.

On the polar side of each of these two zones there would be a broad band extending up into the polar regions, the prevailing winds within which are the opposites of the trade winds, viz: S. W. in the Northern and N. W. in the Southern hemisphere.

The equatorial edge of these calm belts is near the tropics, and their average breadth is 10° or 12°. On one side of these belts the winds blow perpetually towards the equator; on the other, their prevailing direction is towards the poles.

They therefore may be considered as nodes in the general system of atmospherical circulation.

The atmosphere which the N. E. and S. E. trade winds keep in perpetual motion towards the equator has for its node the equatorial calms. Here it ascends, boils over, divides, and flows on in the upper regions of the atmosphere, one part going to the Northern, the other to, the Southern hemisphere, to complete the round and supply the sources of the trade winds.

Arrived near the Tropic of Cancer, the northern current meets, in the upper regions of the atmosphere, the return current which the prevailing winds of the North temperate zone have carried as a surface current to the hyperborean regions of the North. These two currents produce another node or calm region, in which the atmosphere descends, and from which it issues both to the North and the South, assuming, on one side, the character of N. E. trades; on the other the character of the S. W. passage winds.

This node has its fellow in the Southern hemisphere; and from one side of the zone of the calms of Capricorn, the wind issues as the S. E. trades; from the other as the N. W. passage winds of the Southern hemisphere.

Along the polar borders of these two calm belts we have another region of precipitation, though generally the rains here are not so constant as they are in the equatorial calms. The precipitation near the tropical calms is nevertheless sufficient to mark the seasons; for whenever these calm zones, as they go from North to South with the Sun, leave a given parallel, the rainy season of that parallel is said to commence. Hence the rainy season in Chile at the South, and in California at the North.

This letter of the series of the charts will enable any one who consults it, to tell to what places the tropical calms bring rain, and in what months the rainy season commences and ends, for any parallel.

To complete the physical examination of the earth's atmosphere, which we have supposed an astronomer in one of the planets to have undertaken according to the facts developed by the wind and current charts, it remains for him to turn his telescope upon the icy regions of the poles. (For that *we* should complete the examination in this respect, it would be necessary to obtain the log book of ships in the anti-commercial regions of the ocean, which we cannot do. As the sea is most open near the South pole, the principles of the general law of atmospherical circulation would be better developed probably by observations in the Antarctic, than in the Arctic regions.)

For the want of such observations, but with the light which these charts throw on the subject for our guide, let us pursue the S. W. passage winds of the Northern hemisphere into the Arctic regions, and see theoretically how they get there; and being there, what becomes of them.

From the parallel of 40° up towards the pole the prevailing winds in the Northern hemisphere as already reported, are the S. W. passage winds, or as they are more generally called by mariners the "Westerly" winds; these prevail over the "Easterly" winds in the ratio of about two to one.

Now if we suppose, and such is probably the case, these "Westerly" winds to convey in two days a greater volume of atmosphere towards the Arctic circle than those "Easterly" winds can bring back in one, we establish the necessity for an upper current by which the difference may be returned to the tropical calms of our hemisphere. Therefore there must be some place in the polar regions at which these S. W. winds cease to go North, and from which they commence their return to the South, and this locality must be in a region peculiarly liable to calms. It is another atmospherical node in which the motion of the air is upward, with a decrease of barometric pressure.

If we now return to the calm belt of the northern tropics, and trace theoretically a portion of air that in its circuit shall fairly represent the average course of these S.W. passage winds, we shall see that it approaches the pole in a loxodromic curve; that as it approaches the pole it acquires from the spiral convolutions of this curve which represents its path, a whirling motion, in the direction of the hands of a clock moving *backwards*, and that the portion of atmosphere whose path we are following, would gradually contract its gyrations, until it would finally ascend, turning against the hands of a watch, as it went around.

Then reaching the upper regions of the atmosphere, its course would be to the southward; or rather, owing to the effect of the axial rotation of the earth, its course would be from the northward and eastward, until it should meet also in the upper regions a like portion from the ascending node formed in the calms near the equator. This place of meeting in the upper regions of the atmosphere, as already remarked, between these two portions of air moving in opposite directions, one from the equator and the other from the pole, takes place in the zone of the calms of Cancer. Here the two balance each other, produce a calm, or the descending node for the Northern hemisphere, with an increase of barometric pressure.

In the Southern hemisphere a like process is going on; only there the N.W. passage wind would, as it arrives near the Antarctic calms, acquire a motion with the Sun, or in the direction of the hands of a watch.

That such is the case, the investigations that are carried on here do not prove, but they, and a process of reasoning guided by analogy, derived from what they do show, suggest that such is *probably* the case.

The general course of the circulation of the atmosphere, as partly established and partly suggested by these researches and other sources of information is: an upper current from the pole, as far as the tropical calms, towards the equator; thence a descent and a surface current (N.E. trades) to the equatorial calms. Here an ascent takes place, through which air is supplied for an upper current each way towards the poles, as far as the zone of tropical calms. Here there is a descent; and a continuation towards the polar regions as a surface current, (S. W. passage winds) until it approaches, in part, the calms of the hyperborean regions. Here it commences to whirl about in the manner already stated, forming the supposed polar calms, in which it ascends, and so commences its return towards the South by reversing the circuit just stated.

"The wind goeth toward the South, and turneth about unto the North; it whirleth about continually, and the wind returneth again according to his circuits."

Letter C of the series shows the points of the compass from which the wind blows in all parts of the ocean, and for any month in the year. These are called the "Pilot Charts," of which the "North Atlantic," in two sheets, and "Coast of Brazil within the Trade Wind Region," in one sheet, have been published. The "South Atlantic" is in press; also the "Pacific Ocean," from the equator to 60° South, and from 70° to 120° West.

Sheets of this series are also in hand for the entire Pacific and Indian Oceans.

The officers employed upon them from time to time have been Lieutenants Herndon, Dulany, H. N. Harrison, Ball and Forrest; Passed Midshipmen Davenport, Powell, De Koven, Wainwright, Balch, Roberts, De Krafft, Woolley, Jackson, Murdaugh, and Semmes, and Professor Benedict.

The "Brazil Pilot" is on a scale to the square of 2° of latitude by 1° of longitude, and extends from the Equator to 23° South.

The rest of the series is on a scale of 5° to a square: that is, the ocean is divided off into districts of 5° of latitude by 5° of longitude. This chart, therefore, consists of a number of engraved squares without regard to figure of the earth, with four inscribed concentric circles in each; and in these circles are radii, drawn so as to represent every alternate point of the compass-card: thus; N.; N.N.E.; N.E.; E.N.E; East; and so on around the compass.

After all the log-books within reach have been examined, and the observations collated, the results are collected for each district, arranged according to months, and entered each set in its *wind-rose*, as the circumscribed square with its concentric circles and points of the compass is called. These entries are made in such a manner as to show at a glance the prevailing winds for any month in any part of the ocean. Not only so: the navigator sees at a glance how many days of observation have been discussed for each month in any district; and of these he sees the number of times calms have been found, and the number of times the winds have come from each of the sixteen points of the compass.

Thus in the wind-rose for the district between 5° and 10° N., 15° and 20° West, he would observe that in August 705 observations as to the course of the wind had been made here, and 13 as to the calms; *i. e.*, out of $\frac{718}{3}$ days passed by ships in this district during the month of August of various years, it was found to be calm thirteen times, of eight hours each; and the winds were observed to blow from E. 4 times*; E.S.E., 17.; S.E., 5; S.S.E., 165; S., 280; S.S.W., 171; S.W., 23; W.S.W., 26; W. 8.; W.N.W. 2; N.W., 1; N.N.W., 2; N.N.E., 1; and the other points 0.

The object has been to get at least one hundred observations for each month in every square of the ocean; this would require for the three great oceans 1,669,200 observations upon the direction of the winds alone.

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* Taking "time" to mean a period of eight hours, or three "times" to make a day.

In some of the wind-roses, or districts of 5° square, we have obtained more than a thousand observations for a single month; whereas, in neighboring districts and other months, we are left without a single observation—so limited and marked are the commercial paths over the ocean, according to the seasons.

Between the route to and fro around Cape Horn, and the routes to and from around the Cape of Good Hope, there is a part of the ocean of immense extent, that is seldom traversed by any vessel.

As the wind is found to blow in any part of any given district or division of 5° square, so it is assumed to blow in all other parts of that district.

The pilot charts therefore give us the number of times that the wind, in any part of the ocean, is found in a given number of times to come from each point of the compass; and consequently, the ratio between the number of times from any one point and all the others.

With such data it is practicable to calculate, according to the doctrine of chances, the track which will give the shortest average passage under canvass from port to port for any month.

This I have done for the route generally, between Europe and America; and from the ports of the United States, as far South as the parallel of Rio de Janeiro.

These routes have been calculated for each month and issued in a book of "Sailing Directions" to Navigators.

In the European voyages I have found not much room for improvement as to routes, except to those who are just entering that trade; to them these charts give all the information as to winds, currents, and routes that is possessed by the oldest and most experienced "Packet Captains."

When navigators generally come to follow these new routes, the average sailing passage between Europe and America will, it is believed, from what has already been done, be somewhat shortened.

But the new routes which these charts have suggested to the equator, and which lead through parts of the ocean in which the winds and currents were not so well understood as they are along the tracks to Europe, have been attended with more decided advantage, and with signal success.

The route of all vessels bound into the Southern hemisphere, whether their destination be the markets of South America, of the Pacific or Indian ocean, is the same as far as the equator: and these charts have actually shortened the average passage hence to the equator, from two days to two weeks according to the season of the year; this is shown by the results of actual trial. More than a hundred passages have been made by these charts, and according to the routes prescribed. The average length of passage by the old route from the ports of the United States to the line, is forty-one days. The average passage by the new routes has been so far, for January, 31 days; for February, 25; for March, 27½; April, 28½; May, 34; June, 33; July, 40; (by the old route in this month the passage is 48 days,) for August, 41; for September, 39; for October, 37; November, 32, and December, 34, against 38½ by the old route.

As I write, I receive the abstract logs of the U. S. S. "Saratoga," (Captain Walker,) and of the merchant barque "Dragon," (Captain Andrew.)

They sailed at the same time, both in the month of September last: the "Saratoga" took the old route;

went as far as 19° of West longitude; and crossed the equator the forty-second day out. The "Dragon" took the new route; crossed the equator the thirty-fourth day; and had passed the parallel of Rio de Janeiro in 23° S., before the "Saratoga" had reached the line; thus making a gain of 1500 miles upon her competitor, with a saving that far of ten days on the passage.

Thus the importance of the undertaking to collect and embody the experience of every navigator as to the winds and currents of the sea, and so to represent it that each may have the benefits of the experience of all, is proved daily. Encouragement is therefore given for the vigorous prosecution of the work.

Upwards of 20,000 sheets of these charts have been distributed, and the demands for them are daily increasing.

Letter D of the series, are thermal charts; they show the temperature of the surface water of the ocean wherever and whenever it has been observed. These observations are characterized by colors and symbols in such a manner that by a mere inspection of the charts, the temperatures for any one month may be recognized and distinguished from the rest. The scale is Fahrenheit; and the temperatures are put down just as they are given in each log-book, without any attempt to correct for error of thermometer. The thermal chart of the North Atlantic, compiled by Lieutenant Gantt, in eight large sheets, is in press. That of the South Atlantic is in process of construction by Lieutenant Gardner, and is nearly ready for the press.

The isothermal lines for 80°, 70° and so on, for every 10° of ocean temperature, are drawn for each month upon these charts.

They afford much valuable and interesting information touching the circulation of the ocean waters, including the phenomena of cold and warm currents; they also cast light upon the subject of the hyetographic and climatic peculiarities of various regions of the earth; they increase to a marked extent our stock of knowledge concerning the Gulf Stream, that great phenomenon of the ocean; for they show that the warm waters of this stream as it pursues its course towards Europe, have a vibratory motion, so to speak, across their course, like a pendulum slowly propelled by heat on one side, and drawn back by cold on the other; It vibrates to and fro with the season, preserving in the mean time a peculiar system of convolutions that calls to mind the graceful wavings of a pennon as it floats gently to the breeze. Indeed, if we imagine the head of the Gulf Stream, hemmed in by the land in the Straits of Bemini, to be stationary there, and then liken the tail of the stream itself to an immense pennon floating gently in a current:—such a motion as such a streamer may be imagined to have, very much such a motion do these charts show the tail of the Gulf Stream to have.

These charts were prepared for the press in four sets,—one set for the temperatures for each season,—but they are to be published with the temperatures of all four seasons on the same sheet. I have therefore not had an opportunity to study them except in sets for one season at a time,—therefore I cannot give as complete an account of all the facts which they develope, as I shall be able to do when they appear with the observations for each month grouped and presented side by side with the observations for all the other months.

In 1844 I read before the National Institute, a paper "on the Gulf Stream and currents of the sea." Up to that time but little was known of this "river in the ocean," except that it exists and conveys an immense body of warm water from the Gulf of Mexico through the Straits of Florida into the Atlantic Ocean, thence along the coast of the United States towards the shores of Europe by the way of the Grand Banks. Beyond this[*] little or nothing was known with regard to it. But since the appearance of that paper, attention has been very much directed to the Gulf Stream.[†] The Coast Survey has been at work upon it, and the information collected by that establishment and the officers of the navy, with regard to it, added to that afforded by these charts, may be said to exceed in philosophical extent and value all that was previously known about it.

These investigators confirm to a remarkable extent the speculations put forth in that paper; they have converted many of the suggestions of theory into philosophical facts, and given increased importance to the views presented in 1844.

In that paper which was read before the National Institute in the month of April, and repeated, by request, before the Association of American Geologists and Naturalists the same year, it was remarked with regard to the Gulf Stream and its counter current, the ice-bearing current from the North:

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[*] "Upon a correct knowledge of the force and set of currents in the ocean, often depends not only the safety of vessel and cargo, but the lives of all on board; and, owing to the want of this knowledge, hundreds of vessels, thousands of persons, and millions of property are annually cast away or lost at sea.

"I do not intend to occupy the time of members with a recapitulation here of what we do know with regard to ocean currents; that indeed might soon be told; for we know little or nothing of them, except that they are to be met with here and there at sea, many of them sometimes going one way and sometimes another; and that the waters of some of them are colder and of others warmer than the seas in which they are found. That we should have a better knowledge of them, and of the laws which govern them is not only an important matter to those who follow the sea, or make ventures abroad, but it is also a matter of exceeding interest to all those whose enlarged philanthropy, or ennobling sentiments prompt in them a desire to diffuse knowledge among their fellows, or in any manner to benefit the human race. The mere fact that this meeting is held at all, is evidence ample and complete that it is composed altogether of such. I therefore submit it is a question for the consideration of this meeting, whether it be not competent for the National Institute to devise and set on foot a plan for multiplying observations and extending our information upon these interesting phenomena. A subject of vast importance in the business of commerce and navigation, the currents of the ocean seem to me to be altogether worthy the attention of this society—a series of well conducted observations upon them would be in perfect unison with the great objects of usefulness for which it was created and now exists, and for which its distinguished members and guests have been invited, and are here assembled from all parts of the country.

"Before such an assemblage of mind and intelligence, it is necessary only to mention the meagre state of our information even with regard to that great anomaly of the ocean, the Gulf Stream, and there will be—there can be, but one mind, as to the importance of making further observations, and of multiplying facts with regard to it. In simply reminding the society, that all we know of this wonderful phenomenon is contained chiefly in what Doctor Franklin said of it more than 50 years ago, that his facts were collected by chance as it were, and his observations made with but few of the facilities which navigators now have, I feel that enough and all has been done that is necessary to be done, in order to impress the Institute with the importance of further observations upon it." * * *
—*Paper on the Gulf Stream and currents of the sea. Read before the National Institute, April* 2, 1844, *by M. F. Maury, Lt. U. S. N.*

[†] "Linked thus with other geological agents, the currents of the sea cannot fail to present themselves to the mind of the geologist, as important and interesting subjects for investigation. How much more so are they in the eyes of the navigator; with him, the source of this coast current is a matter of conjecture, and its cause a mystery. And as to its strength, its fluctuations and the laws which govern them, his nautical books are all but silent. Nor has the history of navigation recorded the first series of systematic observations upon it.

"Proceeding further into the Atlantic, we find a vast stream of warm water running counter to this. It is the Gulf Stream bound from the Straits of Florida to the Banks of Newfoundland, and thence to the shores of Europe. What its breadth or its depth may be, we know not. We are told indeed that even at the same place it runs sometimes at the rate of two knots the hour, sometimes at five, and we know that it may always be found within certain broad limits, varying in this too at the same place, from 140 to 340 miles. With this our knowledge of it ends; though more accurate information as to it and its offsets would many a time have saved the mariner from disaster and shipwreck, and even now, would add not a little to the speedy and safe navigation of the Atlantic.

"Though navigators had been in the habit of crossing and recrossing the stream, almost daily, for the space of near 300 years, its existence even was not generally known among them, until after Dr. Franklin discovered the warmth of its waters, about 70 years ago. And to this day, the information which he gave us, constitutes the basis, I had almost said the sum and substance of all we know about it."—*Ibid.*

"The Gulf Stream, as it issues from the Straits of Florida, is of a dark indigo blue; the line of junction between it and the '*roily*' green waters of the Atlantic, is plainly seen for hundreds of miles. Though this line is finally lost to the eye as the stream goes North, it is preserved to the thermometer for several thousand miles; yet to this day the limits of the Gulf Stream, even in the most frequented parts of the ocean, though so plainly marked, are but vaguely described on our charts. Thousands of vessels cross it every year; many of them make their observations upon it; and many more, if invited, would do the same. But no one has invited co-operation;* consequently there is no system, and each one that observes, observes only for himself; and when he quits the sea, his observations go with him, and are to the world as though they had not been. * *

"Supposing the pressure of the waters that are *forced* into the Carribbean Sea by the trade winds to be the *sole* cause of the Gulf Stream, that sea and the Mexican Gulf should have a much higher level than the Atlantic. Accordingly, the advocates of this theory † require for its support 'a great degree of elevation.' Major Rennell likens the stream to 'an immense river descending from a higher level into a plain.' Now, we know very nearly the average breadth and velocity of the Gulf Stream in the Florida Pass. We also know, with a like degree of approximation, the velocity and breadth of the same waters off Cape Hatteras. Their breadth here is about 75 miles against 32 in the 'Narrows' of the Straits, and their mean velocity is three knots off Hatteras against four in the 'Narrows.' This being the case, it is easy to show that the depth of the Gulf Stream off Hatteras is not so great as it is in the 'Narrows' of Bemini by nearly fifty per cent., and that, consequently, instead of *descending*, its bed represents the surface of an inclined plane from the North, *up* which the lower depths of the stream *must* ascend. If we assume its depth off Bemini to be two hundred fathoms, which are thought to be within limits, the above rates of breadth and velocity will give one hundred and fourteen fathoms for its depth off Hatteras. The waters, therefore, which in the Straits, are below the level of the Hatteras depth, so far from descending, are actually *forced up* an inclined plane, whose submarine ascent is not less than ten inches to the mile!

"The Niagara is an 'immense river descending into a plain.' But instead of preserving its character in Lake Ontario as a distinct and well defined stream for several hundred miles, it spreads itself out, and its waters are immediately lost in those of the Lake. Why should not the Gulf Stream do the same? It gradually enlarges itself it is true; but instead of mingling with the ocean by broadspreading as the 'immense rivers' descending into the Northern lakes do, its waters, like a stream of oil in the ocean, preserve their distinctive character for more than 3,000 miles.

"Moreover, while the Gulf Stream is running to the North from its supposed elevated level at the South, there is a cold current coming down from the North; meeting the warm waters of the Gulf midway the ocean, it divides itself and runs *by the side of them* right back into those very reservoirs at the South, to which theory gives an elevation sufficient to send out entirely across the Atlantic a jet of warm water said to be more than three thousand times greater in volume than the Mississippi river. This current from Baffin's Bay has not only no trade winds to give it a head; but the prevailing winds are unfavorable to it, and for a great part of the way it is below the surface, and far beyond the propelling reach of any wind. And there is every reason to believe that this polar current is quite equal in volume to the Gulf Stream. Are they not the effects of like causes? If so, what have the trade winds to do with the one more than the other?

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* The wind and current charts have called forth the co-operation here proposed.

† That the Gulf Stream is caused by the trade winds.

"Nay more. At the very season of the year when the Gulf Stream is rushing in greatest volume through the Straits of Florida and hastening to the North with the greatest rapidity, there is a cold stream from Baffin's Bay, Labrador, and the coasts of the North, running to the South with equal velocity. Where is the trade wind that gives the high level to Baffin's Bay, or that even presses upon or assists to put this current in motion? The agency of winds in producing currents in the deep sea must be very partial.

"These two currents meet off the Grand Banks, where the latter is divided. One part of it underruns the Gulf Stream, as is shown by the icebergs which are carried in a direction tending across its course. The probability is, that this 'fork' *continues on towards the South*, and runs into the Carribbean Sea, for the temperature of the water at a little depth there, has been found far below the mean temperature of the earth, and quite as cold as at a corresponding depth off the Arctic shores of Spitzbergen. * * * *

"More water can not run from the equator, or the pole, than to it. If we make the trade winds cause the former, some other wind must produce the latter; but these, for the most part, and for great distances, are *submarine* and therefore beyond the influence of winds. Hence, it should appear that *winds* have little to do with the general system of aqueous circulation in the ocean.

"The other 'fork' runs between us and the Gulf Stream to the South as already described. As far as it has been traced, it warrants the belief that it too runs *up* to seek the so called *higher* level of the Mexican Gulf. * * * * * * *

"Therefore this immense volume of water, in passing from the Bahamas to the Grand Banks, meets with an opposing force in the shape of resistance, sufficient in the aggregate to retard it two miles and a half the minute, and this only in its Eastwardly rate. There is, doubtless, another force quite as great, retarding it towards the North, for its course shows that it is the resultant of two forces acting in different directions. If the former resistance be calculated according to received laws, it will be found equal to several atmospheres. And by analogy, how inadequate must the pressure of the gentle trade winds be to such resistance, and to the effect assigned them? If, therefore, in the proposed inquiry we search for a propelling power no where but in the higher level of the Gulf, we must admit, in the head of water there, the existence of a force capable of putting in motion and of driving over a plain, at the rate of 5 miles the hour, all the waters as fast as they can be brought down by 3,000 such streams as the Mississippi river—a power at least sufficient to overcome the resistance required to reduce from two miles and a half to a few feet per minute, the velocity of a stream that keeps in perpetual motion one-fourth of all the waters in the Atlantic Ocean. * * *

"But, in addition to this, may there not be a peculiar system of laws not yet revealed, by which the motion of fluids in such large bodies is governed when moving through each other in currents of different temperature. That currents of sea water, having different temperatures, do not readily commingle, is shown by the fact already mentioned: that the line of separation between the warm waters of the Gulf and the cold waters of the Atlantic is perfectly distinct to the eye for several hundred miles; and even at the distance of a thousand miles, though the two waters have been in contact and continued agitation for many days, the thermometer shows that the *cold water on either side still performs the part of river banks* in keeping the warm waters of the stream in their proper channel.

"In a winter's day off Hatteras, there is a difference between these waters of near 20°. Those of the Gulf being warmer, we are taught to believe that they are lighter; they should therefore occupy a higher level than those through which they float. Assuming the depth here to be 114 fathoms, and allowing the usual rates of expansion, figures show that the middle of the Gulf Stream here should be nearly 2 feet higher than the contiguous waters of the Atlantic. Were this the case, the surface of the stream would present a double inclined plane, from which the water would be running down on either side, as from the roof of a house. As this ran off at the top, the same weight of colder water would run in at the bottom; and thus, before this mighty stream had completed half its course, its depths would be brought up to the surface, and its waters would be spread out over the ocean. Why then does not such a body of warm water, flowing and adhering together through a cold sea, obey this law, and occupy a higher level? If it did, the upper edges of its *cold banks* would support a lateral pressure of at least 100 lbs. to the square foot; and vessels, in crossing it, would sail over a ridge as it were; on the East side of which, they would meet an Easterly current; and on the West side, a Westerly current. * * * * * *

"The maximum temperature of the Gulf Stream is 86°, or about 9° above the ocean temperature due the latitude. Increasing its latitude 10°, it loses but 2° of temperature. And, after having run 3,000 miles towards the North, it still preserves, even in winter, the heat of summer. With this temperature, it crosses the 40th degree of North latitude, and there, overflowing its *liquid banks*, it spreads itself out for thousands of square leagues over the cold waters around, and covers the ocean with a mantle of warmth that serves so much to mitigate in Europe the rigors of winter. Moving now more slowly, but dispensing its genial influences more freely, it finally meets the British Islands. By these it is divided, one part going into the polar basin of Spitzbergen, the other entering the Bay of Biscay, but each with a warmth considerably above ocean temperature. Such an immense volume of heated water can not fail to carry with it beyond the seas a mild and moist atmosphere. And this it is which so much softens climate there. * * *

"May there not exist between the waters of the stream and their *fluid banks*, always heaving and moving to the swell of the sea, a sort of *peristaltic* force, which, with other agents, assists to keep up and preserve this wonderful system of ocean circulation? * * * *

"The line of meeting between the waters of the Gulf Stream and the Atlantic is distinct to the naked eye for several hundred miles. This unreadiness of cold and tepid sea-water to commingle has been often remarked upon, and seems to impart to one current the power of dividing and turning others aside. Thus the Gulf Stream bifurcates the Labrador current, one part of which underruns the Gulf Stream, and the other takes a southwestwardly direction along the coast. * * * *

"*It would be curious to ascertain the routes of these under-currents on their way to the tropical regions*, which they are intended to cool. One has been found at the equator 200 miles broad and 23° colder than the surface water. Unless the land or shoals intervene, it no doubt comes down in a spiral curve. * *

"What time more fit,—what occasion more suitable than the present for maturing a plan of operations, and for setting on foot a system of observations upon the Gulf Stream and its kindred phenomena of the sea?"[*]

Thus, by a process of reasoning and argument it was shown that the Gulf Stream as far as the Banks of Newfoundland flows through a bed of cold water, which cold water performs to the warm, the office of banks to a river;[†] and which "cold banks" thus pointed out, were discovered with the deep-sea thermometer by Lt. George M. Bache, U. S. N., in 1846, while operating in connection with the Coast Survey. They partake so decidedly of the character of banks to a river, that in the annual report of the Coast Survey for 1846, and elsewhere, these banks were likened to a "cold wall," and by Lt. Bache in his report to the superintendent of the survey, to a "bank of cold water against which the Gulf Stream butts up."[‡]

It was also theoretically shown that the Gulf Stream actually flows up hill:[§]

That its bottom is a bed of cold water:[||]

That it bifurcates a cold stream from the North, near the Banks of Newfoundland, and that one fork of this stream pursues thence on the other side of the Gulf Stream a *southwestwardly* course as a current of cold water, for the most part submarine:[¶]

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[*] From this question may be traced the origin of the undertaking, which has resulted in the "wind and current charts." The association appreciating the importance of the subject and the suggestions connected with it, readily came forward and used their influence in behalf of the undertaking. It was remarked to them then:

"Gentlemen here, and good men everywhere, can do much to aid in this plan by giving it their countenance, and using their influence with masters by inducing them to send to Washington an abstract of their logs, though it contain only the track of the vessel, with the winds and temperatures. Even this would be valuable, and any thing additional would be much more so. Our whalemen do collect and have it in their power to give much truly valuable information. That which they collect concerns the meteorologist, the naturalist and others, not less than the navigator and geologist. Indeed, the ocean, with its almost unsealed book of mysteries, presents to the votary of science, whatever be the name of his association, a common highway, upon which each society, like every nation, may make its ventures and return in vessels laden with treasures to enrich the mind and benefit the human race."—*Extract from a "Paper on the Currents of the Sea as connected with Geology, read before the association of American Geologists and Naturalists, May* 14, 1844—*by M. F. Maury, Lt. U. S. N.*"

[†] "The cold water on either side, still at the distance of a thousand miles, performs the part of *river banks* in keeping the warm-water of the (Gulf) Stream in the proper channel."—*Paper on the Gulf Stream and Currents of the Sea.*

[‡] "Here on the left we have the main currents of the (Gulf) Stream turned to the Eastward by Cape Hatteras, and *butting up against a bank of cold water*, which it overflows."—*Report of Coast Survey*, 1846, *Appendix, No.* 4, *page* 50.

[§] "It is easy to show that the depth of the Gulf Stream off Hatteras is not so great as it is in the "narrows" of Bemini by nearly 50 per cent, and that consequently, instead of *descending*, its bed represents the surface of an inclined plane from the North, up which the lower depths of the stream *must* ascend. If we assume its depth off Bemini to be 200 fathoms which are thought to be within limits, the above rates of breadth and velocity will give 114 fathoms, for its depth off Hatteras. The waters, therefore, which in the straits are below the level of the Hatteras depth, so far from descending, are actually forced up an inclined plane, whose submarine ascent is not less than 10, inches to the mile."—*Paper on the Gulf Stream and Currents of the sea, read before the National Institute by M. F. Maury, Lt. U.S.N., April* 2, 1844.

[||] "As this," (the warm water of the Gulf Stream made specifically lighter by its temperature,) "ran off at the top, *the same weight of colder water* would run in at the *bottom.*"—*Ibid.*

"The Gulf Stream bifurcates the Labrador current; one part of which *underruns* the Gulf Stream."—*Paper on the currents of the sea as connected with geology, read before the Association of American Geologists and Naturalists, May* 14*th*, 1844, *by M. F. Maury, Lieut. U. S. N.*

[¶] "Apparently, in obedience to the laws here hinted at, there is a constant tendency of polar waters towards the tropics and of tropical waters towards the poles."—*Lt. Maury on the Gulf Stream.*

"It would be curious to ascertain the routes of these under currents on their way to the tropical regions, which they are intended to

That it is bifurcated by the British Isles:[*]

And that its surface is a double inclined plane, having the ridge or line of meeting of these two planes near the axis of the stream,—from which the surface water, like the rain from the roof of a house, runs off towards each side.[†]

Most, if not all the conditions which the study of the subject induced me in 1844 to announce as theoretically to exist, have since, as already remarked, been converted into physical facts, by the operations of the Coast Survey, or by the navigators who have been observing in connection with the wind and current charts.

The observations made in 1846 by Lieut. George M. Bache, U. S. N., for the Coast Survey,[‡] and continued in 1847,[§] and 1848,[||] by Lieutenants S. P. Lee and Richard Bache upon the deep sea and surface temperatures in and about the Gulf Stream, and confirmed as to the surface temperatures by these charts, as well as by the observations of Lieut. J. C. Walsh, U. S. N., while observing in connection with them in 1850,—this mass of careful observations thus collected,—all goes to confirm the theoretical suggestions of 1844 with regard to the *cold banks* and currents of cold water over or through which the Gulf Stream finds its way to the Northward.

The officers of the Coast Survey already alluded to, discovered the banks of the Gulf Stream off the coasts of North Carolina and Virginia to be a "wall of cold water," and also that the water at great depths was at a very low temperature—38° of Fahrenheit.

They also found on the surface of the ocean, East of the Gulf Stream, layers or streaks of warm water; it was inferred that this warm water comes from the Gulf Stream,—that it sent off a branch in the direction of the Island of Bermuda. It was concluded, therefore, that here was a bifurcation of this stream.

In 1850, Lieut. Walsh, who was sent out in the U. S. Schooner "Taney," to make certain observations which Congress had authorised the Secretary of the Navy to have made, in connection with my researches[¶] concerning the winds and currents of the sea, found like layers or streaks of warm and cold water, and came to a like conclusion, as to this bifurcation or "off set" of the Gulf Stream.

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cool. One has been found at the equator 200 miles broad and 23° colder than the surface water. Unless the land or shoals intervene, it no doubt comes down in a spiral curve; meeting the warm waters of the Gulf midway the ocean, it (the cold current) divides itself and runs by the side of them right back into those very reservoirs at the South."—*Ibid.*

[*] "It finally meets the British Islands. By these it is divided—one part going into the polar basin of Spitzbergen; the other entering the Bay of Biscay."—*Ibid.*

[†] "In a winter's day off Hatteras, there is a difference between these waters of near 20°. Those of the Gulf being warmer, we are taught to believe that they are lighter; they should therefore occupy a higher level than those through which they float. Assuming the depth here to be 114 fathoms, and allowing the usual rates of expansion, figures show that the middle of the Gulf Stream here should be nearly 2 feet higher than the contiguous waters of the Atlantic. Were this the case, the surface of the stream would present a double inclined plane, from which the water would be running down on either side, as from the roof of a house. As this ran off at the top, the same weight of colder water would run in at the bottom; and thus, before this mighty stream had completed half its course, its depths would be brought up to the surface, and its waters would be spread out over the ocean. Why then does not such a body of warm water, flowing and adhering together through a cold sea, obey this law, and occupy a higher level."

[‡] *Vide* "Annual Report of the Coast Survey for 1846."

[§] *Vide* "Annual Report of the Coast Survey for 1847."

[||] *Vide* "Annual Report of the Coast Survey for 1848."

[¶] See paper marked D.

In a letter* giving me an account of his cruise, which was unfortunately interrupted by his vessel proving to be unseaworthy, he says; " we discovered the *hot waters of the Gulf Stream* extending as far East as 72° 10′, in a latitude so far South as 33° 30′. The column of water temperature in the Abstract,† from May 23 to 29, while engaged in the search for Ashton Rock, will satisfy you of this interesting and important fact, for you will notice that whenever we reached that longitude in our various tracks between the latitudes of 33° 30′ and 34° North, we experienced a sudden change of as much as 5° and 6° in the surface temperature,—70° to 76° :—this must be a branch or off set from the Gulf Stream."

Now these charts do not show that the temperature of the ocean between these parallels beyond the Gulf Stream is any higher than it is between the same parallels generally, until you approach the coast of Africa. The isotherm of 70° for each month, generally, after leaving the Gulf Stream stretch off to the Eastward, going up as high in some months as the parallel of 45°. Recrossing the parallel of 40° North between the meridians of 15° and 20° W., they then make a sharp turn to the Southward and Eastward, showing all the surface water between that and the Equator, to be permanently 70° and upwards. It is not probable, therefore, that the Gulf Stream can supply such an extent of Ocean with its warm waters; nor is it clear, that the warm water of the cool and warm streaks, reported as above, came from the Gulf Stream. The cool water was probably the intruder from below; indeed these charts have revealed a natural process of heating and cooling the surface of the Ocean, which I am not certain has been discovered before. It is exceedingly beautiful, and goes far to explain this phenomenon of the streaks: when the rays of the Sun are operating with their greatest intensity in the Northern hemisphere, they then raise the temperature of the equatorial surface of the ocean to the highest pitch. Its waters thus becoming lighter, flow to the North in a gentle surface current of warm water.

Thus the isotherm of 80°, for example, will pass from its extreme Southern to its extreme Northern declination in about three months.

Being now left to the gradual process of cooling by evaporation and radiation, it occupies the other eight or nine months of the year, in gradually returning South to the parallel whence it commenced to flow North. How natural that in flowing North, it should go in layers; and in cooling, that some parts should cool faster than the others; also that the cool water from below, should now and then be forced up through the mantle of warm water with which the heat has covered certain parts of the Ocean. When we come down to the lower temperatures—the isotherm of 60°—for example, the reverse takes place. In this case the most rapid motion of this isotherm is due to a movement of the waters from the hyperborean regions.

Between the meridians of 25° and 30° West, the isotherm of 60° in September, ascends as high as the parallel of 56° N. In October, it reaches the parallel of 50° North. In November, it is found between the parallels of 45° and 47°, and by December, it has nearly reached its extreme Southern descent between these meridians, which it accomplishes in January, standing then, near the parallel of 40°. It is all the rest of the year in returning Northward to the parallel whence it commenced its flow in September.

Now it will be observed, that this is the season—from September to December—immediately succeeding that in which the heat of the Sun has been playing with greatest activity upon the polar ice. Its melted waters which are thus put in motion in June, July and August, would probably occupy the fall months in reaching the parallels indicated.

These waters though cold and rising gradually in temperature as they flow South, are probably fresher; and if so, probably lighter than the sea water; and therefore, it may be that both the warmer and cooler systems of these isothermal lines are made to vibrate up and down the Ocean, by a gentle surface current in the season of quick motion; and in the seasons of the slow motion, by a gradual process of calorific absorption in the one case, and by a gradual process of cooling in the other.

We have the same phenomenon exhibited by the waters of the Chesapeake Bay, during the winter.

At this season of the year, the charts show that water of very low temperature is found projecting out and over-lapping the usual limits of the Gulf Stream. The outer edge of this cold water, though jagged, is circular in its shape, having its centre near the mouth of the Bay. The waters of the Bay being fresher than those of the sea, may therefore, though colder, be lighter than the warmer waters of the ocean. And thus we have repeated here, though on a smaller scale, the phenomenon as to the flow of the cold waters from the North, which forces the surface isotherm of 60° from latitude 56° to 40°, during three or four months.

We have in the making of ice, and in the melting of it again, examples of this irregularity of outline on a still smaller scale. In the freezing of an ordinary pond, the fascicles of ice shoot out, and represent with their spires the jagged edges, or the cold and warm streaks alluded to. They perfectly illustrate in freezing the manner in which a gentle current of warm water overflowing a surface of cold water, may be supposed to send out its couriers or advance streams ahead; and, in melting, the reverse, or the case of the cold water intruding upon the warmer.

From these facts, and in the view which I am induced to take of them, I am led to infer that the mean temperature of the atmosphere between the parallels of 56° and 40° North, and over that part of the ocean in which we have been considering the fluctuations of the isothermal line of 60°, is at least 60° of Fahrenheit,—and upwards, from January to August, and that the heat which the waters of the ocean derive from this source, atmospherical contact, and radiation,—is one of the causes which move the isotherm of 60° from its January to its September parallel.

It is well to consider another of the causes which are at work upon the currents in this part of the ocean, and which tend to give the rapid southwardly motion to the isotherm of 60°.

We know the mean dew point must always be below the mean temperature of any given place, and that consequently as a general rule at sea, the mean dew point, due the isotherm of 60°, is higher than the mean dew point along the isotherm of 50°, and this again higher than that of 40°—this than 30°, and so on.

Suppose merely for the sake of illustration, that the mean dew point for each isotherm, be 5° lower than the mean temperature, we should then have the atmosphere which crosses the isotherm of 60°, with a mean dew point of 55°, gradually precipitating its vapors until it reaches the isotherm of 50°, with a mean dew point of 45°. By which difference of dew point, the total amount of precipitation over the entire zone, between the isotherms of 60° and 50°, has exceeded the total amount of evaporation from the same surface.

Now as a general rule in the Atlantic ocean, and it may be inferred in the Pacific also, the prevailing direction of the winds, to the North of the 40th parallel of North latitude, is from the Southward and Westward, in other words, it is from the higher to the lower isotherms; passing, therefore, from a higher to a lower temperature over the ocean, the total amount of vapor deposited by any given volume of atmosphere, as it is blown from the vicinity of the tropical, towards that of the polar regions, is greater than that which is taken up again. How the land may modify this position is another question. I speak of the rule at sea, not of the exceptions on the land.

Now then these investigations have brought out prominently before us the fact, that there is near the tropics, both of Cancer and Capricorn, a belt of calms across the great oceans. That on the Equatorial side of these belts, the winds at the surface of the sea blow permanently towards the Equator,—i. e., they come from a cooler and go to a warmer region, thus increasing their capacity for moisture, and consequently taking up more vapor in this part of their circuit, than they precipitate down upon it again.

On the polar side of these calm belts of the tropics, the prevailing direction of the wind on the surface of the ocean, is towards the poles—i. e., from a warm to a colder temperature; and therefore in this part of their circuit, these winds must deposite more vapor than they can take up again.

These facts, though they be not new, yet they are pressed by the charts so forcibly upon us, that we are led irresistibly to the theoretical conclusion, that the trade wind regions of the ocean are the evaporating regions, and that as a general rule in all other regions of the world, except the deserts, and a few others, mostly on the land, the evaporation is less than the precipitation, and that the excess is returned by the rivers and the rains in the shape of currents from towards the poles to the evaporating regions of the Torrid Zone, and that the total amount of rain and river water discharged into the sea, without the limits of the evaporating region, expresses the volume by which the cold currents exceed the warm currents of the sea—designating as cold currents, all those which run into the Torrid Zone, and those as warm which bring their waters from it.

These charts indicate that upon the ocean, the area comprehended between the isotherms of 40° and 50° Farenheit, is less than the area comprehended between isotherms 50° and 60°; and this again less than the area between this last and 70°;—for the same reason that the area between the parallels of latitude 50° and 60° is less than the area between the parallels of latitude 40° and 50°; and they indicate that *theoretically* more rain to the square inch ought to fall upon the ocean between the colder isotherms of 10° difference, than between the warmer isotherms of the same difference.

Thus, to make myself clear: the aqueous isotherm of 50° in its extreme Northern reach, touches the parallel of 60° N. Now between this and the Equator there are but three isotherms: 60°, 70° and 80°, with the common difference of 10°. But between the isotherm of 50° and the pole, there are at least five others, viz: 40°, 30°, 20°, 10° and 0°, with a common difference of 10°. Thus to the North of the isotherm 50°, the vapor which would saturate the atmosphere from zero, and perhaps far below, to near 50° is deposited; while to the South of 50° the vapor which would saturate it from the temperatures of 50° up to that of 80°, can only be deposited. At least such would be the case if there were no irregularities of heated plains, mountain ranges, land, &c., to disturb the ocean laws of atmospherical circulation.

Having therefore theoretically at sea, more rain in high latitudes, we should have more clouds: and therefore it would require a longer time for the Sun with his feeble rays, to raise the temperature of the cold water, which from September to January, has brought the isotherm of 60° from latitude 56° to 40°, than it did for these cool surface currents to float it down.

After this Southward motion of the isotherm of 60° has been checked in December by the cold, and after the sources of the current which brought it down have been bound in fetters of ice, it pauses in the long nights of the Northern winter, and scarcely commences its return till the Sun re-crosses the Equator, and increases its power, as well in intensity as in duration.

Thus we have here, for the first time beautifully developed, the effects of night and day, of clouds and sunshine upon the currents of the sea. These effects are modified by the operations of more powerful agents, which reside upon the land; nevertheless feeble though those of the former class be, a close study of the thermal charts will indicate that they surely exist.

Now returning towards the South:—we may on the other hand infer that the mean atmospherical temperature for the parallels between which the isotherm of 80° fluctuates, is below 80° for the nine months of its slow motion. This vibratory motion suggests the idea that there is probably somewhere between the isotherm of 80° in August, and the isotherm of 60° in January, a line or belt of invariable or nearly of invariable temperature, which extends on the surface of the ocean, from one side of the Atlantic to the other. This line, or band, may have its cycles also, but they are probably of long periods.

Theoretically, such a line ought to be found for any given year, but its place for one entire year, may not coincide with its place for another, though the motion of such a belt from year to year, would probably be very small.

The observations upon which these charts are founded, run through a period of half a century; consequently they show the temperature for the months only, without regard to the year, and therefore they do not enable us to decide satisfactorily as to the existence of such a belt of uniform or nearly uniform ocean temperatures for any one year.

Taking the isotherms of 50° and 60°, to illustrate the manner generally in which the waters of different temperatures run into each other, we shall find that their line of separation is not smooth, but jagged. The line of junction below the warm and cold waters of the sea is not unlike the sutures of the skull bone on a grand scale. The waters of one temperature are dove-tailed and fitted into those of another, in apparently the most irregular manner; but nevertheless like the sutures of the skull when they come to be examined closely, these lines of articulation clearly indicate traces of symmetry.

Now a vessel,—when waters of marked differences of temperature meet,—that sails along their line of junction, will come across layers or streaks of water, at one time warmer, at another cooler. Where a jagged point of warmer water is found in one month to thrust itself up into a body of cooler water, perhaps the next month it will be found that this obtruding of the warm water has disappeared and given place to the intrusion from the cooler water, of an articulating surface equally irregular in its outlines. Such layers of cooler and warmer streaks of water are generally to be found along that part of the usual sailing route between New York and the north of Europe, which runs with the Gulf Stream.

A better idea as to these irregularities in the temperature of the ocean, cannot be conveyed than by quoting from the logs of a few of the many vessels in that trade, which are co-operating with me in collecting materials for the "Wind and Current Charts," and from which it will be seen that it is by no means an extraordinary occurrence for the water thermometer in the course of one good day's sail, to pass through a range—up and down—of 50°.

EXTRACT FROM ABSTRACT LOGS.

1850.	Latitude.	Longitude.	Temperature of water.	Change of Temperature.	
	° ′	° ′	°	°	
May 6	39.43 N.	64.0 W.	66	+ 20	Ship "Prince Albert," Capt. Meyer,— New York to London. 1850.
7	41.5	62.10	42	— 24	
8	42.20	60.0	41	— 1	
9	40.27	59.15	66	+ 25	
10	41.55	56.10	48	— 18	
11	41.34	52.0	60	+ 12	
12	41.5	50.10	60	0	
13	42.20	46.0	51	— 9	
14	44.10	42.20	68	+ 17	
15	45.20	40.30	62	— 6	
	° ′	° ′	°	°	
May 9	40.36 N.	67.23 W.	46	— 1	Ship "Ticonderoga," Captain Farran,— New York to Liverpool. 1850.
10	41.10	63.30	62	+ 16	
11	41.0	59.32	54	— 8	
12	41.33	55.44	45	— 9	
13	41.26	52.8	60	+ 15	
14	40.52	49.0	64	+ 4	
15	41.50	47.33	51	— 13	
16	42.19	47.5	44	+ 3	
17	43.19	44.34	64	+ 10	
	° ′	° ′	°	°	
May 27	38.41 N.	70.41 W.	54	+ 3	Ship "Queen of the West," Capt. Hallet, New York to Liverpool. 1850.
28	38.56	64.17	78	+ 24	
29	41.20	59.10	52	— 26	
30	41.31	55.23	57	+ 5	
31	44.16	48.34	40	— 17	
June 1	44.16	43.15	57	+ 17	
2	45.28	30.58	61	— 4	
3	46.29	35.53	55	— 6	

EXTRACT FROM ABSTRACT LOGS—*Continued.*

1850.	Latitude.	Longitude.	Temperature of water.	Change of Temperature.	
	° '	° '	°	°	
May 30	40.30 N.	66.5	60	0	Ship "Princeton," Captain Russell,—New York to Liverpool. 1850.
31	41.45	65.0	42	— 18	
June 1	41.1	63.37	60	+ 13	
2	40.16	61.41	48	— 12	
3	41.14	57.37	62	+ 14	
4	41.49	56.49	64	+ 2	
7	42.21	50.18	44	— 20	
9	44.18	42.29	60	+ 16	
10	44.38	38.42	52	— 8	
11	46.10	33.57	58	+ 6	
	° '	° '	°	°	
June 13	41.35 N.	52.55 W.	66	+ 4	Ship "Ivanhoe," Captain King,—New York to Liverpool. 1850.
14	42.8	48.21	49	— 17	
15	43.0	44.39	66	+ 17	
	° '	° '	°	°	
June 10	41.55 N.	51.40 W.	63	+ 13	Ship "New York," Captain Marshall,—New York to Liverpool. 1850.
11	41.47	48.20	54	— 9	
	° '	° '	°	°	
June 30	40.29 N.	61.14 W.	62	+ 2	Ship "Roscius," Captain Eldridge,—New York to Liverpool. 1850.
July 1	41.29	59.41	74	+ 12	
2	41.30	53.20	70	— 4	
3	41.37	48.38	58	— 12	
4	41.27	46.14	68	+ 10	
	° '	° '	°	°	
June 17	42.49 N.	51.50 W.	53	+ 3	Ship "West Point," Captain Allen,—New York to Liverpool. 1850.
18	43.35	49.20	47	— 6	
19	45.4	44.0	57	+ 10	
	° '	° '	°	°	
Feb. 6	42.53 N.	52.49 W.	38	— 3	Ship "Philadelphia," Capt. Stotesbury,—New York to Liverpool. 1850.
7	43.58	48.08	31	— 7	
8	44.37	43.44	57	+ 26	
	° '	° '	°	°	
Dec. 19	40.46 N.	68.24 W.	46		Royal Mail Steamer "Asia," Capt. Judkins, from New York to Liverpool. 1850.
20	42.55	62.50	50	+ 4	
21	44.23	56.54	40	— 10	
22	46.50	51.24	40	0	
23	48.50	44.55	30	— 10	
24	50.41	37.52	46	+ 16	
25	51.22	29.27	52	+ 6	
26	51.34	20.48	53	+ 1	
27	51.17	12.59.45	57	+ 4	

EXTRACT FROM ABSTRACT LOGS—*Continued.*

1850.	Latitude.	Longitude.	Temperature of water.	Change of Temperature.	
	° ′	° ′	°	°	
Dec. 17	40.10	55.51	68	— 3	Ship Argo, Captain Crawford,—New York to Havre, 1849.
18	42.02	52.30	47	— 21	
18	42.52	48.48	38	— 9	
20	43.00	45.40	37	— 1	
21	42.33	45.26	61	+ 24	

These extracts are taken at random. They will give those who have not access to the charts, some idea of the changes of temperature in these streaks of cold and warm water. They will also afford a clue as to the frequency with which these cold and warm streaks change their positions.

There is on this route a peninsula of cold water, which hangs down into the Gulf Stream like a curtain dropped from the North. Its position as well as its dimensions vary. It often covers several degrees in extent—and it affords instances of the greatest and most sudden changes that are known to take place in the temperature of the surface waters of the sea. It is generally found about the parallel of 45°, and the meridian of 50°. Covering frequently an area of hundreds of miles in extent, its waters differ as much as 20°, 25°, 30°; and in rare cases even as much as 35° of temperature from those about it.

These waters doubtless came down from the cold regions of the North, and are perhaps in the strongest part of that current.

The bottom of the sea in that region,—the Grand Banks,—assist, no doubt, in forcing this mass of cold waters to the surface; and the fact that they penetrate far down across the usual track of the Gulf Stream, seems to indicate that their momentum here is greater than the momentum of the warm waters of the Gulf Stream, which they push aside.

Between this peninsula of cold water and Newfoundland there is a layer or branch of warm waters; perhaps, these are brought there by a bifurcation of the Gulf Stream. Here we have clearly and unexpectedly unmasked the very seat of that agent which produces the Newfoundland fogs. It is over an area frequently embracing several thousand square miles in extent, covered with cold water, and surrounded on three sides with an immense body of warm. May it not be that the proximity to each other of these two very unequally heated surfaces out upon the ocean, would be attended by atmospherical phenomena not unlike those of the land and sea breezes? These warm currents of the sea are powerful meteorological agents. I have been enabled to trace in thunder and lightning, the influence of the Gulf Stream in the Eastern half of the Atlantic, as far North as the parallel of 55° N.; for there in the dead of winter a thunder storm is not unusual.

Reviewing now what has been said concerning the layers of cold and warm water along the European route of the Gulf Stream, and returning to the cool and warm streaks mentioned by Lieut. Walsh, and the officers of the Coast Survey: it appears probable that the warm waters which they encountered and reported as coming from the Gulf Stream, are the warm waters properly due the latitude, partly interlacing the cooler waters of the same regions in the seasons described. The difference of temperature may be partly due, also, to the warm waters of the surface being separated into streaks by the cooler waters of the submarine current which by the agitation of the ocean are here and there brought to the surface through the thin layer of warm surface water.

If we draw a line of a degree or two in breadth from the capes of the Chesapeake and the Delaware Bays towards Cape St. Roque in Brazil, we shall find in this direction, after crossing the Gulf Stream, a layer of water a little cooler than that on either side of it. This layer extends to the equator, and is sometimes very clearly marked:—so much so that I have been at a loss to account for it. Like an immense lake, it is surrounded with waters of a higher temperature. It cannot therefore be brought there by a cold surface current. It is strictly a *layer*, in contradistinction to a current.

The only idea that has suggested itself in explanation of this phenomenon is in the conjecture that there may be stretching off in this direction, a submerged mountain range or ridge at the bottom of the sea, across which the cold waters of this submarine current as it forces itself into the Caribbean sea, are brought to the surface by the agitation of the waves.

Standing out like peaks in this range are the Islands of Fernando de Noronha, the Penedo de San Pedro, and the Bermudas. The Islands and mountains of Cuba, occupy a position which a mountain spur from this sunken range might be supposed to occupy.

Lieut. Walsh, in the "Taney," was directed to run across this supposed submarine range of mountains, a zig-zag line of deep-sea soundings, from the equator to the capes of Virginia. But unfortunately his schooner proved unseaworthy, and he had to abandon this interesting part of his work.

Captain Powell of the U. S. S. "Jno. Adams," in 1850, found himself on a shoal in the South Atlantic, and the fact was first made known entirely by the change in temperature of the surface water. Finding the water to become cool, he got a cast of the deep sea lead and found bottom. These facts, as far as they go, give some sort of plausibility to the conjecture.

The isotherms of 60°, 50° and 40°, take a northeastwardly direction across the Atlantic, and show the waters of the ocean to be as warm, indeed warmer, between latitude 60° and 65° off the shores of Europe than they are on this side near the parallels of 40° and 45°.

That the Gulf Stream is roof-shaped: that is, it is higher in the middle and lower at the edges—and that it has a roof-current running from the middle or axial line to either edge, as suggested in 1844, has been proved by experiments since made with regard to it by officers of the navy.

Thus in lowering a boat to try the current, they found that the boat would invariably be drifted towards one side or the other of the stream, while the vessel herself was drifted along in the direction of it. Now were it possible to make a vertical section across the Gulf Stream, the top of it would appear convex and the bottom concave, unless where the bottom of it reaches the bottom of the sea.

This feature of the Gulf Stream throws a gleam of light upon the *locus* of the Gulf weed, by proving that its place of growth cannot be on this side of the middle of that stream. No Gulf weed is ever found West of the thread of the Gulf Stream; and, if we admit the top of the stream to be higher in the middle than at the edges, it would be difficult to imagine how the Gulf weed should cross it, or get from one side of it to the other.

The inference therefore would be, that as all the Gulf weed which is seen in the stream is on its eastern declivity, the *locus* of the weed must be somewhere within or near the borders of the stream, and to the East of the middle. And this idea is strengthened by the report of Captain Scott, a most intelligent shipmaster, who reports to me that he has seen the Gulf weed growing on the Bahama Banks. I have specimens of it which he had the kindness to send me, with seed vessels, plucked up from the bottom while at anchor on the edge of the Gulf Stream. Hence we account for the fact that the Gulf weed should be seen on the Eastern and not on the Western borders of the Gulf Stream.

It is proposed to construct from the same journals, which give the temperature of the air, also, another set of thermal charts which shall relate to the temperature of the atmosphere over the ocean, though Professor Dove, by means of his valuable thermal charts of the atmosphere, has rendered this labor much less interesting than in the absence of his exquisite work it would have been; for it has already been shown by my charts, in connection with his, that the remarkable bending of his isotherms as they enter the land along the western shores of Northern Europe and America, is owing in a great degree to the manner in which the aqueous curves of equal temperature approach those shores.

Letter E of the series,—the Storm and Rain Charts,—was commenced for the North Atlantic by Lieutenant Wm. Rogers Taylor, U. S. N., and in his absence at sea, has been continued by Lieutenant Wm. H. Ball.

The object of these charts is to show the total number of observations that have been made for each month, in every space of 5° square in the ocean; and then to show, for every square and month, the number of days each in which there was a rain, a calm, a fog, thunder and lightning, or a storm and the quarter whence it blew.

This series is not yet ready for the press, though a vast amount of labor has been bestowed upon it as well as the others.

The manner in which these observations are collected from the quarry of log books;—brought together and discussed;—and the officers at work upon them, reminds one of the sculptor: any single touch of the chisel, however well directed, does but little towards developing the figure which in due time is to stand out from the rude mass; so with these observations: any single one however accurate, is in itself worth but little. It is only by oft-repeated observations multiplied and brought together in sufficient numbers to express their own meaning, that results can be obtained. Then, like the piece of statuary, the charts speak for themselves, and all at once stand out before the compiler, eloquent with facts which the philosopher never dreamed were lurking near.

Among the various phenomena presented in the course of these investigations, some have pointed to the

"Mem.—9th.—We lost six shot in attempting to sound to-day, owing to the heavy swell, which caused the line to snap when the ship rose abaft. We then tried a bar of iron which weighed about twelve pounds, which descended more rapidly than the shot; but the line failed and snapped. At length we resorted to a thirteen pound lead, and got bottom as above. The light weight of the lead caused the line to go out very slowly towards the last, but I have no doubt of the sounding. I set the drift at about one mile, from which you can easily calculate the perpendicular depth. The first day we lost one shot only by the parting of the line; the second attempt was entirely successful.

"10th. Lat. obs. N. 31° 64′. Long. D. R. W. 61° 15′. Too rough for sounding.

"11th. The experiments of to-day have cast a doubt over the former soundings, and I am now uncertain whether we have ever obtained bottom. This forenoon we got, as I supposed, an excellent cast, and the line stopped running out at 1,000 fathoms; the strain was very great upon the line, when it was pulled upon, but as the breeze was light, it was some minutes before it parted. I felt confident that we got bottom at the time. But this afternoon there was as perfect a calm as I ever saw; we thought it would be well to verify the cast of the forenoon, and renewed the soundings; the line stopped running out at 1,500 fathoms, and the ship had not drifted apparently ten yards; the line was up and down. But upon pulling upon it, the line came in gradually, though very heavily; indeed, sufficiently so as to cause me to believe that if the ship had had headway it would have parted. And yet we hauled in some three hundred fathoms, the weight diminishing as it rose, but with no sudden relief of strain, as if the line had snapped. It at once occurred to me that if the shot had broken the line at that depth, the effect upon the reel would have been the same, and it became doubtful whether we had got bottom in this, or in any other sounding. We have lost eleven shot to-day; once the line snapped at 300 fathoms, and once at 600 fathoms. I ought to say, rather, that the knots made by the rope-makers slipped. The twine seems to be of unequal strength, and sometimes parts without the slightest apparent cause; it may be that the knots have slipped on such occasions. I know that some knots have slipped, from hauling in the end, and finding it cut square off, whereas a fracture always leaves the strands of different lengths at the broken end. We have, at last, learned how to start the shot fairly, which is a point of great importance. Take three parts of the twine, for about fifteen fathoms, and lower the shot into the water carefully; hold back the reel (which is fitted with a crank, and stands upon a support,) until it takes the whole weight of the shot upon the three parts, eight or ten fathoms of which remain upon the reel; when all ready, let go the crank, and the shot descends without jerking; it is necessary to have a compressor upon the edge of the reel, to keep it from revolving too rapidly, as the line is apt to run off and get foul in such cases; a piece of old canvas in a man's hand, is probably the best thing of the sort that can be used. I am well satisfied with our reel, (which was made by Capt. Platt's direction at the Boston Navy Yard,) and am also satisfied of the entire practicability of this mode of sounding, if you can get us *good* line; by good, I mean of *equal* strength. I send you a specimen of our twine, which easily bears the shot, but in some cases has parted with it when there has been no jerk, and no unusual duration of the strain. I should think that you might have good twine made of this size, of fine flax, and carefully knotted, or spun in one length, which would answer every requirement.

"Lat. obs. 30°05′ N., long. chro. 58°52′ W. Line run out 1,000 faths. Time running out 11 minutes. Temp. air 78°. Temp. water 74°. Lat. obs. 29°58′ N., long. 58°48′ W. Line run out 1,500 faths. Time running out 28 minutes. Temp. air 72°. Temp. water 74°.

"December 12th. The experiments in sounding to-day have been signally unfortunate, and I much fear that no satisfactory result will ever be obtained with the line we have. In fact, it is only throwing away the shot, and is moreover a complete loss of time. We lay to two hours to-day, and achieved nothing.

"The 1st shot parted after running 7 minutes, at a depth of 600 fathoms; the fracture took place near the surface, and I send you the end that we hauled up. You will see how it untwisted, although it did not break there. The twisted end, with a single knot upon it, is where it broke, I think there was a knot there which slipped.

"The 2d shot parted at about 20 fathoms below the surface; no jerk, and the reel running freely. I send you the end that we hauled up, it has two knots near it. You will see that both this and the former are clean, sharp, cut ends. I think that this also was knotted and slipped.

"The 3d shot parted the line between the reel and my hand, when it had ascended 300 fathoms, and had been running about 2¼ minutes. I send you the end, which has three knots near it. It is a decided break; though there was no reason why it should have broken: the reel was running freely, and no strain upon the line. It is though evidently a weak spot.

"The 4th shot parted the line at a great depth, when it had run out 550 fathoms, and had been running 5 minutes.

"The 5th shot parted in the same way, after 200 fathoms had run out.

"In these five experiments the line was *oiled*.

"The 6th shot parted the line after 200 fathoms had run out; the oiling was dispensed with in this case.

"The seventh and last sounding was made with an unoiled line, with three bars of iron lashed together, about 18 inches long, and weighing about 12 lbs. The line parted after running out 1,000 fathoms between the reel and my hand, when the weight was descending very slowly indeed; there was scarcely strain enough to turn the reel; it is evidently a *slip*, as you may see from the end, which I send you; it has seven knots near it. It had been running 22 minutes.

"I also send you two specimens, cut from our twine, to show you what sort of stuff has been sent to us. As a matter of strict fact, we are somewhat to blame for the slipping of knots, although we had no reason to suspect that they would slip before yesterday. Still, the makers should be rowed-up for being so faithless. By the way, we did not get the line until a day or two before we sailed, and had no chance to examine it carefully, and were even obliged to mark it in the greatest hurry. Capt. Platt was informed that it would be sent to him marked at every thousand fathoms, but it did not have a mark upon it. Send us good line, and we will give you as many soundings as you wish. The captain is much interested in the experiments, as you may see from the expenditure of shots; we have lost 25 in these few experiments, enough to show that the line is not trustworthy. A light weight gives very uncertain soundings, by reason of the great length of time it takes to run out, and the great drift in consequence.

"December 16th. For several days past we have been overhauling the line, re-knotting it, and *waxing* it; to-day we made another experiment; the line run well, and parted at 1,600 fathoms. I have no doubt that the wax was of service to it, but the line is not suitable, and we did not deem it expedient to try it again to-day.

"Lat. obs. 21°34′ N.; long. chro. 63°24′ W. Temp. air 84°. Temp. water 81°. Time the line was running out, 28 minutes."

The U. S. Ship "Saratoga," Captain Walker, bound to the East Indies, was furnished with 100,000 fathoms of twine, of triple strength, for deep-sea soundings,—but much to my regret, I have not heard of a single cast by that vessel. She crossed the Atlantic nearly twice, on her way to Rio; and, having to cross it again thence to the Cape of Good Hope; a line of deep-sea soundings by her would have been of exceeding value. It is to be hoped she did not neglect them. The twine provided is measured, marked and wound on reels of 10,000 fathoms each, and the length of the line required to reach the bottom, is known by the quantity that remains on the reel after each cast.

It is hoped that the deep-sea soundings to be taken under this order will enable us to determine the shape of the great oceanic basins.

Letter F of the series—"The Whale Charts"—relates to the places of resort of the whale,—sperm and right,—according to the months.

These charts were commenced for the whole ocean in 1847, by Lieut. William L. Herndon—He was interrupted in these highly interesting investigations, by orders for sea service. He had proceeded far enough however with the charts to develop some of the first fruits, which, it might be expected, are concealed in a field so abundant with treasures as this may be well supposed to be.

The plan of conducting these investigations is by spaces of 5° square, and the observations are so entered as to show at a glance the number of days for each month spent in each square; the number of days in which whales—and whether they are sperm or right—are seen; also, the years in which whales of either kind were seen, and the years in which they were not seen in any given square.

As observation after observation in such an immense field was recorded day after day, with the most untiring industry, and as the oft-repeated process finally began to express a meaning, I was surprised to find the lines for entering the right whales through certain districts of the ocean, were blanks, from one side of the chart to the other. Finally it was discovered that the torrid zone is to this animal forbidden ground, and that it is physically as impossible for him to cross the equator as it would be to cross a sea of flame. In short, that there is a belt from two to three thousand miles in breadth, and reaching from one side of the ocean to the other, in which the right whales are never found.

Hence the discovery that the fish called the right whale in the Northern hemisphere is not the fish which goes by this name in the Southern. That the right whale of Behring's Straits and the whales of Baffin's Bay are probably the same animal; and if so, that there is at times at least, an open water communication through the polar regions between the Atlantic and Pacific oceans, for this animal not being able to endure the warm waters of the equator, could not pass from one ocean to the other unless by way of the Arctic regions.

The investigations connected with these animals have also pointed out to us the great currents of warm water which keep up the ocean circulation of the Pacific—it might be said of the globe; for as we study their habits, these dumb creatures teach us by their instincts that there are continuous currents in the sea between places the most remote.

With the aid of what the whales have taught us, in connection with what we have learned from other sources, we can now *almost* prove the existence of a continuous current of water from the borders of the Red Sea into the English Channel. The current, which has its genesis partly in the Red Sea, and partly in the Indian Ocean and its contiguous bays, is bifurcated off the African coast, by a cold current from the South. And were it possible to throw into the Red Sea two bottles properly marked and labelled, which would not be drifted out of the current, but which would separate at the forks of the stream, these two bottles would, or might pass, one around Cape Horn, the other around the Cape of Good Hope;—and, meeting again in the tropical regions of the Atlantic Ocean, it would theoretically be possible for them to drift into the Caribbean Sea;—thence through the Gulf of Mexico;—and by the Gulf Stream out again into the Atlantic Ocean;— and by its waters to be cast up together on the shores of the British Islands, as the drift of the Gulf Stream is often cast.

There is an under current from the Red Sea, and the course of the supposed bottles would be with that under current out into the Gulf of Aden;—thence, rising to the surface in the Arabian Sea—an immense cauldron without any escape, as from our Gulf of Mexico, for its heated waters to the North,—they would be drifted to the South in the currents from this sea: arrived near the Cape of Good Hope, this current is bifurcated by a cold one from the South going to replace the waters which it has conveyed from the North.

Here the bottles would separate, one following the Lagullas current around the Cape of Good Hope into the Atlantic.

The other taking the other branch of the stream, would be drifted to the southward of New Holland, and be carried into the Antarctic regions near Victoria's land. Here the current being cooled down and deflected, it would commence its flow toward the North in the ice-bearing current which flows into the Atlantic around Cape Horn,—the icebergs of which I have encountered in latitude 37° South. Bottles that have been thrown overboard off Cape Horn, have been picked up on the shores of Ireland.

However, without pursuing just now this system of currents pointed out by the bottles and the whales, I propose at another time a still further investigation into these beautiful and interesting facts which the Whale Charts are developing.

After Lieut. Herndon was called away, the investigations for these charts were continued by Lieut. Leigh. His duties having been since changed, Lieut. Fleming is now at work upon the "Whale Charts," and preparations are in progress for putting them to press.

They will show in what parts of the ocean the whales "use" in each month, and the knowledge cannot fail to prove of great importance to the whaling interests of the country,—an interest which keeps in continual occupation a fleet of 600 sail manned by 15,000 American seamen—and which fishes up annually from the depths of the ocean, property the real value of which far exceeds that of the gold mines of California.

Respectfully, &c.,

M. F. MAURY,

Lieut. U. S. N.

On the probable Relation between Magnetism and the Circulation of the Atmosphere.

JANUARY 30, 1851.

The discoveries of Faraday in dia-magnetism are calculated to guide me and to illuminate the darkness in which I have found myself so often surrounded, as I endeavored to follow the "wind in his circuits" over the trackless wastes of the ocean.

Oxygen composes one-fifth part of the atmosphere and is magnetic.

The discovery that it is magnetic, presents itself to the mind as a great physical fact which is to serve as the key stone for some of the most grand among the sublime and beautiful structures which philosophy is erecting for monuments to the genius of the age.

The facts elicited from the Wind and Current charts, had already pointed me to the work of some agent whose office in the grand system of atmospherical circulation was neither understood nor recognized.

In following these facts to their legitimate conclusions, and in studying all the phenomena that these charts have successively revealed touching the grand system of the distribution of moisture and the circulation of the atmosphere over the surface of the earth, I have often been induced to suspect that some other agent besides heat and the rotation of the earth on its axis, was concerned in the matter.

Never suspecting the character of this agent, its foot prints have at least been detected; and there is reason to suppose that Faraday has discovered its lurking place to be in the oxygen of the atmosphere.

These charts had enabled me to trace from the belt of calms, near the tropic of Cancer which extends entirely across the seas, an efflux of air both to the North and to the South; from the South side of this belt the air flows in a never-ceasing breeze, called the N. E. trade winds, towards the equator.

On the North side of it, the prevailing winds come from it also; but they go towards the N. E. They are the well known southwesterly winds which prevail along the route from this country to England in the ratio of two to one.

Now these last named winds are going from a warmer to a colder climate; and therefore it may be supposed that nature exacts from them what we know she exacts from the air under similar circumstances, but on a smaller scale before our eyes, viz: more precipitation than evaporation.

Where then does the vapor, which these winds carry along, come from? was one of the questions suggested by the charts.

We saw that the air of which the N. E. trades winds are comprised, and which comes out of the same zone of calms, as do these southwesterly winds, so far from being saturated with vapor at its exodus, was dry ;—the N.E. trade winds are for the most part dry winds ;—we perceived that going from a lower to a higher temperature their evaporating powers were increased; that they had to travel in their oblique course, towards the equator, a distance of near 3000 miles; that as a general rule they evaporated all the time, and all the way, and precipitated little or none on their route; that they were not saturated with moisture until they had arrived fully up to the region of equatorial calms, a zone of constant precipitation.

This calm zone of Cancer borders also, it was perceived, upon a rainy region.

Where then does the vapor, which is here on the northern edge of this zone of Cancer, condensed into rains—and where also does the vapor which the rain winds that flow out on the polar side of this zone—where? was the oft-repeated question,—does the vapor which is condensed into rains for the extra tropical regions of the North, come from?

It might possibly be taken up by the N. E. trade winds; and it might be the residuum, which, after supplying the equatorial calms with their rain, was carried up in the ascending column of air there, and which residuum was brought back in the upper regions of the atmosphere by the current which we know perpetually blows up there, counter to the trade winds.

We know that there is an upper current of perpetual winds from the equatorial to the tropical calms,—that the volume of air moved by these two upper currents, North and South, to Cancer and Capricorn, is equal to the volume that is felt on the surface, as the N. E. and S. E. trade winds.

I knew of no law of nature which would forbid the supposition that the air which has been brought down as the N. E. trade winds to the equatorial calms, should, after ascending there, return by the counter and upper currents to the calm zone of Cancer, here descend and re-appear on the surface as the N. E. trade winds again. I knew of no agent in nature which would *prevent* it from taking this circuit; but while I knew of no agent in nature that would prevent it from taking this circuit, I knew on the other hand, of circumstances which rendered it probable that such in general is not the course of atmospherical circulation—that it did not take this circuit. I speak of the rule, not of the exceptions; these are infinite, and for the most part are caused by the land.

And I moreover knew of facts which greatly strengthen the supposition, that after arriving at the calms of Cancer and descending, the winds which have come in the upper regions of the atmosphere from the Equator, do not return to the Equator on the surface, but continue on the surface towards the pole.

And these are the circumstances which favor the conjecture that the winds which flow in the upper regions of the atmosphere from the Equator to the calms of Cancer, do not, after arriving and descending in the midst of these calms, turn about and go back to the Equator with the N. E. trades: on the contrary, these are the facts and circumstances which give strength to the supposition that they continue on towards the pole, as the prevailing southwesterly winds of the extra tropical North:

We have seen that on the North side of this calm zone of Cancer, the prevailing winds on the surface are from this zone towards the pole; in other words if *s* represent the total volume of atmosphere which blows on the surface towards the North on the polar side of Cancer, and ϕ the total volume which moves on the surface from the pole towards the calms of Cancer, then s being the rule and ϕ the exception, we shall have $s > \phi = s'$. Therefore s' is the quantity which must return in the upper regions of the atmosphere from the Arctic regions to the calm zone of Cancer; and if we take δ'' as the quantity which comes from the equator in the upper regions of the atmosphere to this same zone of calms, we shall have the momentum of δ'' equal to the momentum of s' as proved by nature in the fact that she has established near each tropic, a zone, or belt of calms.

The Cancer zone of calms in the Atlantic ocean is known to American seaman as the "Horse Latitudes," from the circumstance that the vessels formerly engaged in carrying horses from New England to the West Indies, found it so difficult to cross this zone: they would often be detained in the calms for many days, during which time the large cargo of horses would exhaust the stock of water, become frantic with thirst, and to save a part, the rest would have to be thrown overboard; hence the name of "Horse Latitudes" to the calms near the tropics of Cancer, and which I have called by the name of that sign.

This is the place where the upper currents of air represented by s' and δ'' meet; they balance each other, produce a calm, and descend to re-appear as surface winds, one blowing to the North and the other to the South from this calm belt.

Now s' could not bring the vapors here which form the rains that are precipitated between this calm belt and the polar regions, because s' had already performed the circuit as a surface wind between this zone and those regions; it had been subjected to a temperature far below zero, and had given out all the moisture that a dew point so very low could extract from it; and as it had returned in the upper regions of the atmosphere where it encountered no fluid surface to replenish it with moisture, it had no vapor on its arrival from the North at the calms of Cancer, to make rains of.

Hence if s' returned to the North as a surface wind after descending in the calm zone of Cancer, it would first have to remain a long time in contact with the sea, in order to be supplied with vapor enough to fill the great rivers and supply the rains for the whole earth between us and the North Pole.

In this case we should have an evaporating region on the North as well as on the South side of this zone of Cancer; but the charts show no such region; I speak exclusively of the ocean.

Therefore I inferred that s' does not come out on the North side of this calm zone, but on the South side; thence to take the circuit of the N. E. trade winds, and to be replenished with vapor; and if it be admitted that such is the general course of s' it must of necessity be admitted that δ'' must re-appear on the North side of this zone as the prevailing surface wind which precipitates on its way to the Arctic regions, the residuum or vapor that it has taken up in the trade-wind region, and brought from the equatorial calms.

Moreover, if δ'' have the vapor which by condensation is to water with showers the extra tropical regions of the Northern hemisphere; nature, we may be sure has provided a guide for conducting δ'' across this belt of calms and for sending it on in the right way. Here it is that I saw the foot prints of an agent whose character I could not comprehend. It was this guide.

Heat and cold, the early and the latter rain are not distributed over the earth by chance; they are dispensed no doubt according to design, and in obedience to laws that are as certain and as sure in their operations as the morning stars in their songs of praise.

If there were really a general mingling in the calms of Cancer, of the atmosphere which comes from the North with that which comes from the South—of the moist and the dry air as it descends here to the surface of the earth—if it depended upon chance whether the dry air should come out on this side, or on that, of the calms of Cancer;—or whether the moist air should return whence it came or not;—if such were the case in nature, we perceive that so far from any regularity as to seasons, we should have, or might have years of droughts the most excessive, and then again seasons of rains the most destructive; but so far from this we find for each place a mean annual proportion of both, that year after year is preserved with remarkable regularity.

Therefore, seeing reasons why s' and d' should cross each other in the calms of Cancer, and seeing no reasons why they should not, I was led to the inference that here probably is a node in the circulation of the atmosphere, where the wind from the North meets the wind from the South, and that each after a pause, continues on its course and returns again to complete his circuit. The fact, it appeared to me, was probable, but the cause a mystery; that is, did this crossing of currents not take place, here would be a barrier in the atmosphere: and we, the inhabitants of the extra tropical regions of the North, would have an atmosphere, between the calms of Cancer and the pole, always to breathe.

Having thus shown that there is no reason for supposing that the upper currents of air when they meet over the calms of Cancer and Capricorn, are turned back to the equator; but having shown that there is reason for supposing that the air of each current after descending, continues on in the direction towards which it was traveling; we may go farther, and by a similar train of circumstantial evidence, afforded by the charts and other sources of information, show that the air moved on the surface by the two systems of trade winds, when arrived at the belt of equatorial calms, and having ascended, continues on thence, each current towards the pole which it was approaching while on the surface.

There is no reason for supposing that the atmosphere does not pass freely from one hemisphere to another; on the contrary many reasons for supposing that it does, present themselves.

If it did not the proportion of land and water, and consequently of plants, and warm blooded animals being so different in the two hemispheres, we might imagine that the constituents of the atmosphere in them would in the course of ages probably become different, and that consequently in such a case man could not safely pass from one hemisphere to the other.

I considered the manifold beauties in the whole system of terrestrial adaptations:—I reflected what a perfect and wonderful machine is this atmosphere:—how exquisitely balanced and beautifully compensated it is in all its parts,—we all know that it is perfect:—that in the performance of its manifold offices it is never once left to the guidance of chance—no, not for a moment:—therefore I was led to ask myself why the air of the N. E. trades when arrived at the zone of equatorial calms, should, after ascending, rather return to the North than the South. Where and what is the principle upon which its course was decided.

Here again I found circumstances which induced me to suppose it probable that it neither turned back to the North, nor mingled with the air which came from the region of the S. E. trades, ascended, and then flowed indiscriminately to the North or the South.

But I saw reasons for supposing that what came to the equatorial calms as N. E. trade winds, continued to the South as an upper current; and that what had come to the same zone as S. E. trade winds, ascended and continued over into the Northern hemisphere as an upper current, bound for the calm zone of Cancer.

And these are the principal reasons upon which this supposition was based.

At the seasons of the year when the sun is evaporating most rapidly in the Southern hemisphere, the most rain is falling in the Northern. Therefore I supposed that much of the vapor which is taken up there is precipitated here.

The evaporating surface in the Southern hemisphere is greater, much greater than that in the Northern: still all the great rivers are in the Northern hemisphere;—the Amazon being regarded as common to both. And this, as far as it goes, is corroborative of the above.

Independently of other sources of information, the charts taught me to believe that the mean temperature of the tropical regions was higher in the Northern than in the Southern hemisphere; for they show that the difference is such as to draw the equatorial edge of the S. E. trades far over on this side of the equator, and to give them force enough to keep the N. E. trade winds out of the Southern hemisphere almost entirely.

Consequently, as before stated, the S. E. trade winds being in contact with a more extended evaporating surface, and continuing in contact with it for a longer time or through a greater distance, they would probably arrive at the trade wind place of meeting, more heavily laden with moisture than the others.

Taking the laws and rate of evaporation into consideration, I could find no part of the ocean of the Northern hemisphere from which, according to the indications of the charts, the sources of the Mississippi, the St. Lawrence and the other great rivers of our hemisphere could be supplied.

It appeared to me, therefore, that the extra-tropical regions of the Northern hemisphere stood in the relation of a condenser to a grand steam machine, the boiler of which was in the region of the S. E. trade winds, and that the trade winds of this hemisphere performed the like office for the regions beyond Capricorn.

The calm zone of Capricorn is the duplicate of that of Cancer, and the winds flow from it as they do from that: both North and South: with this difference, that on the polar side of the Capricorn belt they prevail from the N. W., instead of the S. W., and on the equatorial side from the S. E., instead of N. E.

Now if it were so, that the vapor of the N. E. trade winds were condensed in the extra-tropical regions of the Southern hemisphere, the following path, on account of the effect of diurnal rotation of the earth upon the course of the winds, would represent the mean circuit of a portion of the atmosphere moving according to the general system of its circulation over the Pacific ocean, viz: coming down from the North as an upper current, and appearing on the surface of the earth in about longitude 130° W., and near the tropic of Cancer, it would here commence to blow the N. E. trade winds of that region.

Its course would be towards the equator somewhat in the direction of the King's Mill group of Islands. Meeting no land in this long oblique track over the tepid waters of a tropical sea, it would, somewhere to the East of these Islands, arrive at the belt of equatorial calms which always divides the N. E. from the S. E. trade winds.

Here depositing a portion of its vapor as it ascends, it would with the residuum take, on account of diurnal rotation, a course in the upper regions of the atmosphere to the S. E. as far as the calms of Capricorn. Here it descends and continues on towards the coast of South America in the same direction, appearing now as the prevailing N. W. wind of the extra-tropical regions of the Southern hemisphere.

Travelling on the surface from warmer to colder regions, it must, in this part of its circuit, precipitate more than it evaporates.

Now this is the route by which, on account of the land in the Northern hemisphere, the N. E. trade winds have the fairest sweep over that ocean. This is the route by which they are longest in contact with an evaporating surface; the route by which all circumstances are most favorable to complete saturation; and this is the route by which they can pass over into the Southern hemisphere, most heavily laden with vapors for the extra-tropical regions of that half of the globe; and this is the supposed route which the N. E. trade winds of the Pacific take to reach the equator, and to pass from it.

Accordingly, if this process of reasoning be good, that portion of South America between the calms of Capricorn and Cape Horn, upon the mountain ranges of which this part of the atmosphere, whose circuit I am considering as a type, first impinges, ought to be a region of copious precipitation. I accordingly turned to the hyetography of Berghaus and Johnson, and find it stated on the authority of Captain King, that upwards of 12* feet of rain fell there in 41 days!

Passing the snow-clad summits of the Andes, this same wind tumbles down upon the Eastern slopes of the range, and then traverses the almost rainless and barren regions of Patagonia and South Buenos Ayres.

These conditions, the direction of the prevailing winds and the amount of precipitation were regarded as evidence afforded by nature, if not in favor, certainly not against the conjecture that such had been the voyage of this vapor through the air. At any rate here was proof of the immense quantity of vapor which these winds of the extra-tropical regions carry along with them towards the poles, and I could imagine no other place than that suggested, whence these winds could get so much vapor.

I am not unaware of the theory or of the weight attached to it, which requires precipitation to take place in the upper regions of the atmosphere on account of the cold there irrespective of proximity to mountain tops and snow-clad hills.

But the facts and conditions developed by these charts are in many respects irreconcilable with that theory. With a new system of facts before me, I have, independent of all preconceived notions and opinions, set about

Arrived at this stage in the process of deduction and finding conformity, the next step was to trace back the vapor that supplies the sources of the Mississippi river and its tributaries with rains, to its place in the ocean whence it came.

It rains more in the valley drained by that river than is evaporated from it again. The difference for a year is the volume of water annually discharged by that river into the sea.

At the time and place that the vapor which supplies this immense volume of water was lifted by the atmosphere up from the sea, it was reasoned that the thermometer stood higher than it did at the time and place where it was condensed and fell down as rain in the Mississippi valley.

I looked to the South for the springs in the sea which supply the fountains of this river with rain. But I could not find spare evaporating surface enough for it in the first place; and if the vapor, I could not find the winds which would convey it to the right place.

The prevailing winds in the Caribbean sea, and southern parts of the Gulf of Mexico are the N. E. trade winds. They have their offices to perform in the river basins of tropical America, and the rains which they may discharge into the Mississippi valley now and then are exceptions, not the rule.

The winds from the North cannot bring vapors from the great lakes to make rains for the Mississippi, for two reasons; first: the basin of the great lakes receives from the atmosphere more water in the shape of rain than they give back in the shape of vapor. The St. Lawrence river carries off the excess.

2d. The mean climate of the lake is colder than that of the Mississippi valley; and therefore, as a general rule, the temperature of the Mississippi valley is unfavorable for condensing vapor from that quarter.

It cannot come from the Atlantic, because the greater part of the Mississippi valley is to the windward of the Atlantic ocean. The winds that blow across it go to Europe with their vapors; and in the Pacific, from the parallels of California down to the equator, the direction of the wind at the surface is from, not toward, the basin of the Mississippi. Therefore it seemed to be established with some degree of probability—or if that expression be too strong—with something like apparent plausibility, that the rain winds of the Mississippi valley, as the general rule, do not get their vapors from the North Atlantic ocean, nor from the Gulf of Mexico, nor from the great lakes, nor from that part of the Pacific ocean over which the N. E. trade-winds prevail.

The same process of reasoning which induced me to look into the trade-wind region of the Northern hemisphere for the sources of the Patagonian rains, induced me to look in the trade-wind regions of the South Pacific ocean, for the vapor springs of the Mississippi.

I therefore last summer addressed a circular letter to the farmers and planters of the Mississippi valley, requesting to be informed as to the direction of the rain winds of each locality, and with the view of acquiring some idea as to the general hygrometric condition of the atmosphere, I asked also to be informed as to the kind and quality of fruits and the like.

To this I have received the following replies: —

From J. M. Janney, Warren county, Ohio.

Lat. 39° 30′ N.; Long. 84° W.

Winds from the southwest, with but few exceptions, bring rain; this is the result of eleven and a half years' observation.

Farm situated between the Miami rivers. There are no mountains nearer than the Cumberland and Alleghany; the one lying in a southeast direction, and the other east of this locality. The nearest point to these elevations is perhaps not short of 225 or 250 miles. Lake Erie, situated about 100 miles north-east of us, is the nearest sheet of water.

The fruits are apples, pears, cherries, strawberries, raspberries, currants, gooseberries, quinces, and peaches. Grapes also thrive well. The products of the soil are maize, wheat, oats, flax, rye, and potatoes.

I may observe that the cold south winds often prevail through the winter; and during the spring *cool*, rather piercing northwest winds frequently assail us; during the prevalence of which drought is almost sure to exist. Snow-storms generally come from the southwest, but occasionally we have a heavy storm of this kind from the east. To me it is obvious that the winds that bring us rain sweep through the great Mississippi and Ohio vallies in their course northeast. [That is, they are southwest winds.]

From Wm. J. Payne, near Rushville, Rush county, Indiana.

Lat. 39° 30′ N.; Long. 85° 30′ W.

The winds are various: the west wind sometimes brings most rain during some years; but the southwest winds are most prevalent, and bring rain the greatest number of years.

Fruits are, peaches, apples, pears, and cherries.

Productions—Corn, wheat, oats, rye, &c.

From Louis Moore, Carrollton, Mississippi.

Lat. 33° 30′ N.; Long. 90° W.

On an average, the winds that bring us rain are the southwest. Farm situated in a hilly district, some 150 miles from the sea-coast. The most common fruits are apples, peaches, &c., and melons in abundance.

Agricultural staples are cotton, corn, oats, potatoes, &c.

From Turner Vaughan, La Guardo, Tennessee.

Lat. 36° 30′ N.; Long. 86° 30′ W.

Winds S. by W. bring the most rain, and W.N.W. the most storms; the latter, however, are unfrequent here, and very partial, owing, perhaps, to remoteness from the *sea*.

Whenever the lightning appears to linger in the North at eventide, rain almost invariably follows speedily; not so in South.

Farm situated twenty-five miles above Nashville; surface undulating, abounding in lime-stone. Hemp and corn do well, tobacco also; wheat and cotton inferior; grapes tolerable.

From Thomas Meaux, Amelia county, Virginia.

Lat. 37° 20′ N.; Long. 78° W.

Point of observation about thirty miles W.S.W. from Richmond.

Prevalent winds in spring, summer, and autumn from S.W., rain falling in showers during these seasons. Gusts and tornadoes, with black clouds come from N.W. in late summer; protracted rains in spring and fall come from N.E.

Prevalent winds in winter E. to W. northwardly. Rains and snows in winter from N.E. Lowest observed temperature 6° Fahrenheit, at sunrise, Jan. 29, 1844; highest, 97°, noon, in shade, 20 July, 1844.

These observations made for twenty years.

From Willis Fawcett, St. Charles, Missouri.

Lat. 39° N.; Long. 90° 30′ W.

Wind from any point of the eastern half of the horizon will bring rain generally, after blowing twelve hours. It frequently happens that we have winds in a dry time to blow much longer, even several days, from that direction, without rain; but on the wind's shifting to the opposite side, we are sure of rain. I think our rains during summer come most frequently from the S.E. Wind from the S.W. is generally accompanied by good dry weather. West and N.W. are dry. I have noticed that thunder and lightning in the north is almost invariably followed here by storms of rain and hard wind within twelve or twenty-four hours.

My farm is on an alluvial prairie plain, (probably formed by the washings of the Missouri and Mississippi) six miles below St. Charles.

The apple is our main dependence. Peaches also flourish finely; as do plums, cherries, (except the black,) strawberries, gooseberries, wild and cultivated. Wheat and corn are the principal productions. Timothy hay will soon be exported from our neighborhood to a considerable extent. I cultivate wheat and corn almost exclusively.

Thus showing, as far as this evidence goes, that the S.W. winds—the winds suggested by the charts—are, except in Western Missouri, the rainy winds. These winds, like those between the same parallels upon the ocean, are going from a higher to a cooler temperature; and these winds in the Mississippi valley not being in contact with the ocean, or with any other evaporating surface to supply them with moisture, must bring the moisture with them from some sea or another.

Therefore though it may be urged, in as much as the winds which brought the Patagonian rains came direct from the sea, that they therefore took up their vapors as they came along; yet it could not be so urged in this case; and if these winds could pass with their vapors from the equatorial calms through the upper regions of the atmosphere to the calms of Cancer, and then as surface winds into the Mississippi valley, it was not perceived why the Patagonian rain winds should not bring their moisture by a similar route. These last are from the N. W., from warmer to colder latitudes; therefore being once charged with vapors they must precipitate as they go, and take up less moisture than they deposit.

This was circumstantial evidence. No fact had yet been elicited to prove that the course of atmospherical circulation suggested by my investigations is the actual course in nature. It is a case in which I could yet hope for nothing more direct than such conclusions as might legitimately flow from circumstantial evidence.

My friend Lieut. De Haven was about to sail in command of the American Expedition in search of Sir John Franklin. Infusoria are sometimes found in sea-dust, rain-drops, hail-stones or snow-flakes; and if by any chance it should so turn out that the *locus* of any of the microscopic infusoria which might be found descending with the precipitation of the Arctic regions should be identified as belonging to the regions of the S. E. trade winds, we should thus add somewhat to the strength of the very slender clue by which we were seeking to enter into the chambers of the wind and to "tell whence it cometh and whither it goeth."

It is not for man to follow the "wind in his circuits," and all that could be hoped, was after a close examination of all the facts and circumstances which these charts have placed within my reach, to point out that course which seemed to be most in accordance with them, and then having established a probability or even a possibility as to the true course of atmospheric circulation, to make it known and leave it for future investigations to confirm or set aside.

It was at this stage of the matter[*] that my friend Baron von Gerolt, the Prussian Minister, had the kindness to place in my hand Ehrenbergh's work, "Passat—Staub und Blut—Regen."

Here I found the clue[†] which I hoped, almost against hope, De Haven would place in my hands.

That celebrated microscopist reports that he found South American infusoria in the blood-rains, and sea-dust of the Cape Verd Islands,—Lyons, Genoa, and other places.[‡]

Thus confirming as far as such evidence can, the indications of the "Wind and Current Charts," and increasing the probability that the general course of atmospherical circulation is in conformity with the suggestions of the charts as I had interpreted them, viz: that the trade winds of the Southern hemisphere after arriving at the belt of equatorial calms ascend and continue in their course towards the calms of Cancer as an upper current from the S. W., and that after passing this zone of calms, they are felt on the surface as the prevailing S. W. winds of the extra-tropical parts of our hemisphere; and that for the most part they bring their moisture with them from the trade wind regions of the opposite hemisphere.

Continuing on towards the North pole from the S. W. they enter the Arctic regions on a spiral curve, continually lessening the gyrations until, whirling about in a *direction contrary to the hands of a watch*, this air ascends and commences its return as an upper current towards the calms of Cancer.

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[*] See my letter to him, paper F.; also, paper read by me before the American Association at its meeting in Charleston, March, 1850.

[†] *Vide* paper F.

[‡] *Vide* paper G, "Passat—Staub, etc." p.—

It returns to this zone from the opposite direction, N. E., by which it approached the pole.

The atmosphere in this part of the circuit is moving in the direction called s' in a previous part of this paper.

Arrived at the calms of Cancer, s' meets δ'' in the upper regions of the atmosphere.

They both descend—and the fact that the barometer stands higher here* than upon any other parallel, shows that here there is an increased atmospheric pressure, caused in part by accumulation produced by the opposing forces of s' and δ''; and in part by the downward currents.

Having descended, s' is forced out on the equatorial side of the zone and appears on the surface as Δ—the N. E. trade winds—and so continues until it reaches the belt of equatorial calms.

Here then is precipitation, an ascent of atmosphere, and a fall of the barometer: Δ now becomes δ or an upper current flowing in a S. E. direction—i. e. from N. W. towards the zone of the calms of Capricorn. Here it is met by the upper current from the Antarctic regions, descends with a rise in the barometer again, and appears on the polar side of this zone of calms, as Δ'—the prevailing N. W. surface winds in the extra-tropical regions of the Southern hemisphere.

Δ' now approaches the Antarctic regions in a *spiral, gyrating with* the hands of a watch and contracting its convolutions as it draws nearer and nearer the pole, where theoretically there is another atmospherical node in which Δ' ascends with a low barometer, and commences its return towards the equator as δ' in the upper regions of the atmosphere.

The same cause—diurnal rotation—which made the Δ' on the surface to approach from the N.W., now operates to make it return as δ' in the direction whence it came.

Arriving in the upper regions at the calm zone of Capricorn δ meets δ'; the two descend, and δ' continues to flow in towards the equator as Δ', the S. E. trade wind.

Arrived at the zone of equatorial calms, it ascends, and continues thence in the upper regions of the atmosphere as δ'', until it reaches the calm zone of Cancer. Here it descends, and continues on as the S.W. passage winds of the Northern hemisphere, whose circuit has been already described.

Thus, at the risk of repetition and of being thought tedious, I have described the progress which the Wind and Current Charts had enabled me to make in the theory of atmospherical circulation; and I have presented that theory as far as it had been developed in my own mind, when I received yesterday No. 1, vol. i, 4th series, of the London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, containing a synopsis of Dr. Faraday's "Experimental Researches in Electricity," 24th, 25th, 26th, and 27th series; and also the letter of Prof. Von Feilitzsch on the *Physical distinction of Magnetic and Diamagnetic Bodies.*

This account, though meagre, is the first account that I have seen of the Doctor's discoveries relative to the magnetism of the atmosphere.

A new era in our knowledge of the laws and the agents concerned in the general system of atmospherical circulation will probably be dated from these discoveries.

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* Humboldt.

With the accounts of them before me, I feel somewhat in the condition of the tempest-tossed mariner who has been buffeting with the waves in storm, clouds, and darkness, until he feels himself almost bewildered and lost in the mist that surrounds him; when suddenly a light appears, and, like the grateful mariner, I wished, before taking a fresh departure, to bring up my reckoning, and to ascertain how far I was out, in order to show how great was the service rendered by the sympathising hand which put forth that light.

Dr. Faraday has shown that, as the temperature of oxygen is raised, its paramagnetic force diminishes, being resumed as the temperature falls again.

" These properties it carries into the atmosphere, so that the latter is, in reality, a magnetic medium, ever " varying, from the influence of natural circumstances, in its magnetic power. If a mass of air be cooled, it " becomes more paramagnetic; if heated, it becomes less paramagnetic, (or diamagnetic,) as compared with " the air in a mean, or normal condition."[*]

Now, is it not more than probable that here we have in the magnetism of the atmosphere that agent which guides the air from the South through the calms of Capricorn, of the equator, and of Cancer, and conducts it into the North; that agent which causes the atmosphere with its vapors and infusoria to flow above the clouds from one hemisphere into the other, and whose foot-prints had become so palpable?

With the lights which these discoveries cast, we see why that air which has completed its circuit to the whirl[†] about the Antarctic regions should then, according to the laws of magnetism, be repelled from the South, and attracted by the opposite pole towards the North.

And when the S. E. and the N. E. trade winds meet in the equatorial calms of the Pacific, would not these magnetic forces be sufficient to determine the course of each current:—bringing the former with its vapors of the Southern hemisphere over into this by the courses already suggested?

This force, and the heat of the sun, would propel it to the north. The diurnal rotation of the earth propels it to the east; consequently its course first through the upper regions of the atmosphere, and then on the surface of the earth, after being conducted by this newly-discovered agent across the calms of Cancer, would be from the southward and westward to the northward and eastward.

These are the winds which, on their way to the North, from the South Pacific, would pass over the Mississippi valley, and they appear to be the rain winds there. Whence then, if not from the trade-wind regions of the South Pacific, can the vapors for those rains come?

According to this conjecture, and not taking into account any exceptions produced by the land and other circumstances upon the general circulation of the atmosphere over the ocean, the S. E. trade winds which reach the shores of Brazil near the parallel of Rio, and which blow thence for the most part over the land, should be the winds which, in the general course of circulation, would be carried towards northern Africa, Spain, and the south of Europe.

They might carry with them the infusoria of Ehrenberg, but, according to this theory, they would be wanting in moisture. Now, those portions of the old world are for the most part dry countries, receiving but a small amount of precipitation.

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[*] Phil. Mag. and Journal of Science, 4th Series, No. 1, January, 1851, page 73.

[†] " It whirleth about continually."—*Bible*

Hence the general rule: those countries to the north of the calms of Cancer which have large bodies of land situated to the southward and westward of them in the S.E. trade-wind region of the earth should have a scanty supply of rain, and *vice versa*.

Now, the extra-tropical part of New Holland comprises a portion of land thus situated in the Southern hemisphere. Tropical India is in its N. E. trade-wind region, and should give it a slender supply of rain. But what modifications the monsoons of the Indian ocean may make to this rule, or what effect they may have upon the rains in New Holland, my investigations in that part of the ocean have not been carried far enough for a decision.

Taking up the theory of Ampère with regard to the magnetic polarity induced by an electrical current, according as it passes through wire coiled *with* or coiled *against* the sun, and expanding it in conformity with the discoveries of Faraday, we perceive a series of facts and principles which, being applied to the circulation of the atmosphere, make the conclusions to which the charts have led me touching the continual "whirl" of the wind in the Arctic regions *against*, and in the Antarctic *with the hands of a watch*, very significant—much more so than I had supposed them to be.

In this view of the subject we see light springing up from various sources, by which the shadows of approaching confirmation are clearly perceived. One such source of light have we from the university of Greifswald, in Prussia.

Likening the atmosphere with its magnetic spirals of oxygen to the coils of a wire, and the poles of the earth as the ends of the helix used by Professor Von Feilitzsch, we might almost fancy that he was experimenting expressly with the view of throwing light upon the general course of atmospherical circulation.

"If," says he in his letter to Dr. Faraday, "we observe two such neighboring particles near the external "south pole, then will the more near repel a south pole with the intensity s; the more distant will turn to a "north pole with the intensity n', but in such a manner that $n' < s$. But outwardly these two excited mag-"netisms act with the difference of their power $s - n'$; but this is in one case *south polar*, consequently of the "same kind as the exciting south pole. The contrary will take place near the north pole, so that the "*disengaged magnetism distributed over the bar becomes south polar on that half which is turned to the south* "*pole, but north polar on the other half that is turned to the north pole*. A substance where this takes place "is *diamagnetic*, it places itself equatorial.

"When the bar of a magnetic substance is so qualified that the separating action of the molecules on "each other must be taken into consideration, then it can become so strong that the molecules in the middle "of the substance are more strongly magnetic than towards the ends. If we observe once more two such "particles near two such particles near the external South pole, the South pole of the nearest will tend to recede "by an intensity $\overset{s}{\text{I}}$ from this external South pole, but the more distant will turn towards it a North pole of the "intensity n'_{I} but in such a manner that $n'_{\text{I}} < {}^{s}_{\text{I}}$. Outwardly the two will act with the intensity $n'^{s}_{\text{I}} - {}^{s}_{\text{I}}$. but this

" is North polar, therefore of a contrary nature to the exciting South pole. The contrary will take place near " the pole so that the *disengaged magnetism distributed over the bar becomes North polar on the half that is* " *turned to the South pole, but South polar on that half which is turned towards the North pole.* A substance " where this takes place is *magnetic*, it places itself *axial.*"*

" Applying the former to the theory of Ampère, I was startled because it has hitherto taught only that " currents which are parallel and directed in the same way attract, but if they are parallel and not directed in " the same manner they are repulsive; therefore, that a current moving in the direction of the hand of a watch, " in a spiral produces a South pole on the entrance point in the spiral, but a North pole on the egression point. " Hitherto only such spirals have been constructed in which the current in every winding shows an equal " intensity."

" But I tried to arrange spirals of the following kind:—one of them is in such a way constructed that " on two copper wires are soldered to each of them, fifteen thin wires covered over with silk. The first winding backwards over the copper wire, i. e. the first convolution of the helices, beginning at the end and proceeding towards the centre is with all the fifteen wires, the second winding is only wound with 14 threads, " whilst the fifteenth is carried along the axis, &c.; consequently every convolution of the fifteen windings " has a thread less, and the ends of all the other threads have direction of the axis. The ends of the fifteen " threads are soldered in the middle, and the two thick wires without touching each other, are so bent that " they can be suspended in the little cups of the apparatus of Ampère, then a current passing through the " spiral will divide itself in such a manner that it is most strong on the external ends of the spiral but decreases " more and more to the middle. If the windings of the spiral took place in the direction of the hand of a watch, " then the end of it where the current enters will become a South pole, but a *North pole* kept parallel to the " spiral *will repel it*, only the final convolution will be attracted, and it represents the disengaged magnetism " of the final surface."

" A second spiral is wound like that described only with this difference that the strongest convolutions are " in the middle, and the feeblest near the ends. This spiral will be attracted by the North pole of a magnet " over the half in which the current moves at first or enters, but the other half will be repulsed by it. The " third spiral has the winding the same strength over the whole extent; it is indifferent to a magnet pole which " is not too near and only the final convolutions are attracted or repulsed."

" Therefore it is permitted to enlarge the theory of Ampère in this manner:—

" — If an electric current passes through a spiral in the direction of the hand of a watch and,,

" *a* If the current is more feeble in every winding as it is nearer to the centre of the spiral, then that half is " attracted by a South pole in which the current enters except the first winding.

" *b* But if the current is stronger in every winding as it is nearer to the centre of the spiral than that " half is repulsed by a South pole in which the current enters including the first winding.

"The contrary will be the case for that half in which the current leaves the helix and likewise for the "North pole of the magnet opposed."*

Attentively considering the experiments of the Professor of Greifswald, we may trace an analogy between his spirals and the spirals which the currents of the wind in "his circuits" describe about the earth. At the South polar calms, the atmospherical spiral is with the hand of the watch, and as in the case of a spiral so wound about its helix the magnetism is South polar; and so *mutatis mutandis* for the regions of North polar calms.

May we not look therefore to find about the North and South magnetic poles these atmospherical nodes or calm regions, which I have theoretically pointed out there? In other words, are not the magnetic poles of the earth in those atmospherical nodes, the two standing in the relation of cause and effect, the one to the other?

And have we not a clue already placed in our hands by which the motion of the circular storms of the Northern hemisphere which travel *against*, and those of the Southern which travel *with* the hands of a watch, seems to be connected with the like motion of the wind of each hemisphere in its circuit about its pole? and will not this clue when followed up lead us into the labyrinths of atmospherical magnetism for the solution of the mystery?

Indeed so wide for speculation is the field presented by these discoveries that we may in some respects regard this great globe itself with its "cups" and spiral wires of air, earth and water, as an immense "pile" and helix, which being excited by the natural batteries in the sea and atmosphere of the tropics, excites in turn its oxygen, and imparts to atmospherical matter the properties of magnetism.

Thus, though it be not proved as a mathematical truth that magnetism is the power which guides the storm from right to left, and from left to right, which conducts the moist and the dry air each in its appointed paths, and which regulates the "wind in his circuits," yet, that it is such a power, is rendered so very probable that the onus is now shifted, and it remains not to prove, but to disprove that such is its agency.

Respectfully &c.,
M F. MAURY,
Lieut. U. S. N.

HON. W. A. GRAHAM,
Secretary of the Navy.

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* Page 49, 50, Phil. Mag.

A.

Programme of the Instructions issued to Lieut. Commanding J. C. Walsh of the U. S. Schooner "Taney," by the Secretary of the Navy, October 4th, 1849.

The object of the service upon which the "Taney" has been detailed, is to make observations upon the winds and currents of the sea, and to collect other facts in connection with the "wind and current charts" of Lieut. Maury, and which are of practical importance to the safe navigation of the seas, or to the study of the phenomena of the ocean. This is an important service. It is a service which requires patient and laborious observations from the officers entrusted with it.

A faithful record of every phenomenon observed with a full statement of all the circumstances as to time, place, &c., connected with it, is of great importance.

It is expected therefore, that you and the officers of the "Taney," will bestow upon the duty which has been assigned yourself and them, because of a peculiar fitness therefor, the utmost diligence and the most assiduous attention.

The subjects of observation which will command your particular attention, are:

1st, The force and direction of the wind, the hourly state of the weather and all the meteorological conditions connected therewith, as thermal, dynamical, barometrical and the like.

2d, The force and set of currents, their depth and width, their temperature and the position of their edges or limits.

3d, Hourly observations upon the temperature of the surface water.

4th, Frequent observations upon the temperature of the ocean at various depths.

5th, Deep-sea soundings.

6th, Vigias and all dangers about which there are doubts either as to existence or position.

7th, Transparency and saltness, or the specific gravity of sea-water, in the different parts of the ocean.

You will determine the specific gravity of the water either by one of the hydrometers or the specific gravity bottle furnished for the purpose.

You will keep an abstract of your log, as per form. It is believed that the form itself is sufficiently explicit as to what is wanted for the abstract, a copy of which you will send to Lieut. Maury, as often as you have an opportunity, returning the original to him when you arrive in the United States.

You will make it a rule, the better to ascertain rate of currents and fix their limits, to determine by observation the variation of the compass and your position in the forenoon, in the afternoon and at night, as well as at noon whenever the weather will permit; and after allowing for lee-way, heave of the sea, variation of the compass and false steerage, you will call the difference between the place of the vessel as established by observation, and as established by *dead reckoning*, current, and so enter it in the abstract.

You will also try in calms and as often as convenient, both for surface and under currents, in the usual

For longitude by chronometer at night, the planets or the largest of the fixed stars are the best objects to be observed when the horizon is good—The Mer. Alt. of the moon may be used for latitude at night or in the fore or afternoon according to its age.

Note in its proper column, not only the portion of cloudy sky, 10 being entirely overcast, and 0 clear; but state also the direction or directions in which the clouds are moving, with the kinds of clouds, as Nimb., Cum., Cirrus, Stratus, &c.

In taking temperature of surface water, a fresh bucket should be drawn up each time, the thermometer plunged into it immediately, held there for several minutes, and *read while the bulb is in the water*.

For the purpose of ascertaining the existence of under currents, you will sound at intervals, at the least, of every 30 miles, with 100 fathoms line, if there be as much depth, attaching to the line two thermometers, one near the lead and the other 50 fathoms from it. In case you have no thermometers suitable, or should lose them, then you will attach two hollow non-conducting cylinders with valves opening upward, in the place of the thermometers, haul the line up briskly and try quickly the temperature of the water brought up in the cylinders.

In case you should find an under current, you will endeavor to ascertain its limits and set with all the accuracy possible. For rate and direction, a block of wood, or a barrega loaded just to sinking, and suspended at any required depth by a small float just sufficient to keep it from sinking further, will perhaps be the best means.

The determination of the rate and set of under currents is an operation which is so modified by the weather and other circumstances, that it must of necessity be left, in a great measure to the judgment and mental resources of the operators. The officers of the "Taney" will perhaps have abundant opportunity to display their ingenuity with regard to the subject. The lead used in sounding for temperatures should be painted white, and the distance at which it disappears going down and reappears coming up should be entered in fathoms in the transparency column.

The "Taney" will be provided with the means of sounding at great depths. It is desirable to reach the bottom at every attempt, for the depth of the ocean is an important element towards a perfect understanding of the tides, their laws of motion, the course and form of the tidal wave and the like.

At the distance of every two hundred miles across the ocean, soundings must be made all the way both going and returning with the view to reach the bottom and determine the depth of the sea. The "Taney" has been provided with the necessary apparatus therefor. In each case the lead must be armed, the specimens of the bottom which it may bring up must be preserved in a bottle with a label attached showing the date, place and the depth. The time selected for these soundings should be calm weather, when the sea is smooth and when there is a likelihood of its so continuing for several hours at least. In hauling up the sounding line from great depths, care should be taken to prevent the lead from having too great an upward motion, lest by turning around it should twist the line in two. Therefore in hauling it up frequent pauses should be made to allow the line to untwist. It is desirable also to have specimens of water from the gratest depths.

In going across the Atlantic and in looking after the vigias and doubtful dangers to which your attention will also be called, it will be most convenient for you to take up your position foi deep sea-soundings in the calm region known as the "horse latitudes," which in the month of October will be found between the parallels of 24° and 35° N. according to longitude; you will see the limits of this calm belt sufficiently marked and developed on series B, of Maury's wind and current chart, with copies of which the "Taney" will be supplied.

A series of accurate barometrical observations in this belt of calms will be of exceeding interest and value. It is one of the nodes in the general system of the atmospherical circulation of the earth. Here the winds from the polar meet in the upper regions, those from the equatorial calms, and they so nearly balance each other as to produce almost a perpetual calm. We may then look under this meeting of opposing winds for an accumulation of atmosphere, and consequently for an increased barometrical pressure, and from this increase of pressure accurately determined, may be derived an expression to show the total amount or value of those physical forces which are exerted to put and keep the trade winds in motion. You will therefore be diligent with the barometer in those regions and in all others, taking care when it is mounted on board to note in the abstract log its distance from the level of the sea.

The "vigias" and dangers of doubtful existence or position which you will look after are Ashton's Rock about latitude 35° 50′ N., longitude 71° 48′ W., said to be 8 feet above the water, and to have been seen in 1824. False Bermudas about latitude 32° 37′ N., longitude 58° 37′ W. They are rocks, said to be frequently mistaken for the Bermudas, they are laid down in a part of the ocean but little frequented.

Nye's Rock - - - -	31°	15′	N. Lat.	Long. 55°	41′	W.
Van Kuelen's Vigia, - - -	31	40	"	" 38	10	"
Josyna Rock, - - - -	31	45	"	" 23	20	"
Steen's Ground, - - -	32	30	"	" 21	15	"

You will touch at one of the Canaries for water. Without unnecessary delay, you will proceed thence towards the Cape Verds, examining as you go the position of Maw's Rock, Bon Felix Shoal, the Bonetta Rocks, and the reef to the west of them, marked on Maury's chart as doubtful with regard to position.

The route, so far as it has been indicated to you, will take you through the Sargasso Sea. You will be careful to try the depth, and the temperature of the water of that sea, and to note the latitude and longitude of its edges where you cross it.

Besides the regular series of deep-sea soundings, you are requested to make frequent use of the lead (deep-sea) in the vicinity of all "vigias" and "rocks" that are supposed to lie in your way; for if they exist, you will probably find shoaler water in their vicinity.

After completing this service, you will put into Port Praya for water and provisions. Filling up with these, and allowing your crew and officers a few days to refresh, you will again put to sea; standing to the southward, and examining as you go Warley's Shoal and French Shoal of 1796; the supposed place of both of which are marked on the charts of Lieut. Maury.

From the last-named shoal you will proceed to a supposed submarine volcanic region of considerable extent between the Equator and 3° south latitude, and between 15° and 25° west longitude. Through all parts of the ocean you will continue as you go, the regular series of observations as to winds, currents, temperatures, soundings, &c., as per form of Abstract Log.

In passing the region of equatorial calms, you will again cross one of those atmospherical nodes under which nice barometrical observations become of exceeding interest.

After having satisfied yourself as to the characteristics with regard to depth and bottom in that part of the ocean just alluded to as probably volcanic, you will proceed to make Cape St. Roque, bestowing unremitted attention to the soundings and temperatures as you go.

There seem to be reasons to suppose that an under-current of warm water has its genesis in this part of the ocean; soundings in deep-sea temperatures across the Southern Atlantic may throw some light upon this important question.

Arriving off Cape St. Roque, and having put into some convenient port of Brazil for water, if necessary, you will proceed to make a zig-zag course along the coast to the northward, for the purpose of investigating the currents thence to the mouth of the Amazon. You will make stretches off from the coast of one hundred miles, or as far as it may be necessary, in order to cross and define the system of currents and counter-currents that are supposed to prevail there, and a correct knowledge of which is so essential to the speedy and safe navigation of that part of the ocean.

Having satisfied yourself as to those currents, you will proceed homeward by the following route:—from the Equator in long. 37° W., draw a straight line to Cape Charles. This line will lay nearly in the middle of a strip of the ocean about 300 miles broad, and which is remarkable for the temperature of its water. You will sail a zig-zag course through this strip, crossing it at least four times on your way home, and passing the line which you are directed to draw, at least two hundred miles on either side, and taking deep-sea soundings before you put about to recross it again. Should you discover anything remarkable as to the depth of the sea within this region, you will push the discovery to a conclusion.

It is expected that you will return to the United States some time in the month of April next.

As the service on which you are engaged has for its object the making of observations and the collecting of facts *at sea*, you will keep the sea during your absence as long as practicable.

It is not expected that you will at all times be able to carry on without interruption the series of observations as here laid down for you. It is supposed that they will be interrupted from time to time by the weather and other circumstances. Much, therefore, must be left to your discretion; you understand the nature of the service which is required, and are in possession of the views of the Department on the subject. The Department therefore commits the service to you, feeling assured that you will in all cases exercise a sound discretion, and so meet its just expectations.

B.

Lieutenant J. C. Walsh to Lieutenant Maury.

BORDENTOWN, NEW JERSEY, *August* 15*th*, 1850.

SIR,—I have to add to the "Abstract Log" of the U. S. Schooner Taney, which has been sent you, ome remarks upon the results of parts of our work there recorded: the explorations in the Atlantic, for some f the many rocks and vigias of doubtful existence,—deep soundings with the wire,—investigations of urrents, particularly the under currents, &c.

The *rocks and vigias* searched for, with the positions assigned to them upon the Charts, are as follows:

Ashton Rock	Lat. 33°50′ N.	Long. 71°40′ W.
False Bermudas	" 32 30	" 21 15
Nye's Rock	" 31 15	" 55 50
Vankeulen's Vigia . . .	" 31 40	" 38 20
Josyna Rock	" 31 40	" 23 45
Steen Ground	" 32 30	" 21 15
Mary's Rock	" 19 42	" 20 45

ot one of them was found, nor any indication of their existence; on the contrary, every evidence to disprove

Our various tracks over and about their reported positions, covering the extent of 1¼ degrees of longitude d 40 miles of latitude, with the many and deep soundings, from 100 to 800 fathoms, without getting ttom, will be found sufficient, I trust, to satisfy navigators that they have no existence,—or at least, that ose parts of the ocean in which they have been reported to exist, are free from all dangers. To the first ree mentioned, we gave the most thorough search: to Ashton Rock, six days time; to the False Bermudas, ght days; to Nye's Rock, likewise eight days. All our tracks were by daylight, as the schooner was always ve to at night while engaged in these explorations. A slight discoloration of water was noticed in the gion assigned to Mary's Rock, but no soundings could be got with 500 fathoms. This rock had been eviously searched for with like results, by the U. S. Exploring Expedition, Captain Wilkes; and by H. M. Levin, Captain Bartholomew. Ashton Rock is placed in a most frequented part of the ocean; there is t a day that some vessel does not pass in the vicinity, and nothing has been seen of it since the first and ly report of it in the year 1824. This fact alone should disprove it, independent of our search. I find Mr. nt has erased it from his Chart of the North Atlantic, as also the False Bermudas, Vankeulen's Vigia, en Ground and Mary's Rock. There are sufficient real dangers in the Atlantic; these imaginary ones uld not disfigure the charts; they only serve to harass navigators, turn vessels from their routes, and thus ure commerce. The reports of them by merchant vessels, which seldom take time to examine the appear-es of such dangers, can be readily explained. Floating wrecks, large trees, carcasses of whales, &c., senting all the appearance of reefs, have deceived experienced seamen.

Though we did so much less in *deep soundings* in the Atlantic, than expected, owing to the rough weather, bad state of the vessel and loss of so much wire, in the first experiment, nevertheless, the proving the ocean to have a depth of more than 5,700 fathoms, (34,200 feet, or more than six statute miles,) as was satisfactorily done in this first trial, is alone of much interest and importance. This vast depth, greater than the elevation of any mountain above the surface, and the greatest depth of the ocean ever yet measured, was reached without finding bottom, in latitude 31° 59′ N., longitude 58° 43′ W., on November 15th, 1849. The wire broke at this length, 5,700 fathoms, at the reel, and this large portion of our supply was thus so early lost. It preserved the exact plumb-line throughout the sounding; there was a steady, uniform increase of weight and tension; no check whatever any instant of its descent,—which prove that it could not have touched bottom before the break.* It had been very carefully measured and marked, so that the *ocean here is deeper than* 5,700 *fathoms*, can be relied upon as accurate. This great sounding is within 32 miles of the assigned position of the rocks, called the False Bermudas, for which we were then in search, which fact alone should go far to disprove them. We had three choice chronometers, two of which performed with rare excellence throughout the cruise, and being a beautiful, clear day, a number of sets of observations were taken in the morning, noon, and afternoon, so that the position was determined with the nicest accuracy. It proved the finest possible day for this work, the sea so smooth, and hardly a breath of wind. Though we found by trial in the morning a slight surface drift, setting to W. S. W., there was no change of position during the sounding, as proved by the observations; the great weight and extent of the wire, penetrating to such profound depths, seemed to serve as an anchor to keep the little schooner steady.

In all our subsequent work under this head, I found the heave of the sea, however slight, was the great difficulty—the lifting of the stern in the pitching motion causing such an immense increase of strain upon the wire, breaking it upon almost every occasion on reaching about 2,000 fathoms. It is under the most favorable circumstances, when the sea is very unusually smooth, that this mode of measuring its vast central depths can succeed.

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* The lead used was but 10 lbs. weight, with a Stellwagen cone fitted to it. Nothing else was attached to the wire but a small instrument (weighing about 6 lbs.) invented by yourself, for indicating the depth reached: I had tested this several times to considerable depths, and found its indications correct. Our arrangements for these deep soundings were altogether very complete. It may be well to add an account of them. We had on board 14,300 fathoms wire, weighing 3,025 lbs., all of the best English steel, of five different sizes, Nos. 5, 7, 8, 10, and 13 (Birmingham gauges.) Every part was tested to bear at least one-third more than the weight which it was calculated to sustain.

An extent of 7,000 fathoms of this, weighing 1,800 lbs. (the remaining 7,300 fathoms, composed of the smaller sizes, Nos. 10 and 13, being stowed away as spare wire,) carefully measured and marked with small copper labels, was linked into one piece, and wound upon an iron cylinder, 3 feet in length and 20 inches in diameter,—the largest-sized wire being wound first, so as to be uppermost in sounding. Two swivels were placed near the lead, and one at each thousand fathoms, to meet the danger of twisting off by the probable rotary motion in reeling up. The cylinder with the wire was fitted to a strong wooden frame, and machinery attached—fly-wheel and pinions, to give power in reeling up. Four men at the cranks could reel up with ease, with the whole weight of wire out. Iron friction bands, which proved of indispensable importance, were connected to regulate the rate of the wire in running off the reel. One man with his hand upon the lever of one of these friction bands could preserve a uniform, safe velocity, checking or stopping the wire as required. The whole apparatus could be taken apart and stowed away in pieces (being so large and massive, this was indispensable in so small a vessel as the Taney.) When wanted for use, the frame was put together and secured to the deck by iron clamps and bolts, near amidships, the reel hoisted up from below and shipped in its place; a *fairleader* was secured to the taffrail, being a thick oak plank, rigged out five feet over the stern, having an iron pulley, 18 inches diameter, fitted in its outer end, and two sheet iron fenders $3\frac{1}{2}$ feet long, of semi-circular shape, fitted under it, to guard the iron wire from getting a short nip in the drifting of the vessel. The wire was led aft, from the reel, over the pulley which traversed freely in the fairleader, and passed between these fenders into the water.

The time occupied in the descent of *the* 5,700 *fathoms*, at the moderate rate it was allowed to go off the reel, using the friction bands, was exactly $1\frac{1}{2}$ hours. I found in the subsequent soundings, that two or three men could reel up 1,000 fathoms in $2\frac{1}{3}$ hours, taking time to rub dry and oil it in passing to the reel, to guard against rust.

The next subject to which I would refer, is our investigations of the *under-currents* of the ocean. I regret we had so few opportunities for these very interesting experiments; but enough has been done to seem to warrant the conclusion, that these under currents are *generally* stronger, setting in various different directions, than those of the surface. I am well aware that there is no mode of testing their *exact* velocity; but that practised by myself, which I will describe, was certainly all-sufficient to show their relative velocity. There may be none so rapid as that mighty oceanic river, the *Gulf Stream:* unfortunately, the weather prevented our making these investigations in that interesting region; but in the various parts of the Atlantic in which we succeeded in these experiments, on only two occasions did we find the under-current of less velocity than that running in a different direction above it. The following is the mode practised in testing them:

The surface-current was first tried by the usual mode (a heavy iron kettle being lowered from a boat to the depth of 80 fathoms); then, for the trial of the under current, a large *chip-log*, of the usual quadrantal form, the arc of it measuring full four feet, and heavily loaded with lead to make it sink and keep upright, was lowered by a light but strong cod-line to the depth of 126 fathoms, (the length of the line;) a barrega was attached as a float, a log-line fastened to this barrega, and the rate of motion of this float, as measured by this log-line and the glass, as well as the direction as shown by a compass, were assumed as the velocity and set of the under current. No allowance was made for the drag of the barrega, which was always in a different direction from the surface current. It was wonderful, indeed, to see this barrega move off against wind, and sea and surface current, at the rate of over one knot an hour, as was generally the case, and on one occasion as much as 1¾ knots. The men in the boat could not repress exclamations of surprise, for it really appeared as if some monster of the deep had hold of the weight below and was walking off with it. I will cite from the Log several instances of these experiments:

On May 11th, in lat. 24°43′ N., long. 65° 25′ W., we found a surface current of one-third knot per hour setting to the West, and an under current, at the depth of 126 fathoms, of one knot, setting W. S. W.—temperature of water at surface 77.3°, at 50 fathoms 77.5°, at 100 fathoms 73.5°. The current felt by the vessel on that day (as deduced from the comparison of the true positions obtained by astronomical observations and chronometers, with those by the dead-reckoning) agreed with this trial of the surface current, being the same within a fraction, viz: 0.3 knot, westerly. On this day, as noted in the "Column of Remarks," the sea was covered by a species of *medusæ*, of a dark-red color, spherical in shape, from one-eighth to three-eighths inch in diameter.

On May 12, at 4 P. M., in lat. 25° 55′ N., long. 64° 43′ W., the surface current was found to be ⅓ knot, setting N. N. E., and the under current (at 126 fathoms) 1¾ knots, setting S. E., being the strong under current I have alluded to: this was well ascertained by several trials—temperature of water at surface 75°, at

35′ W., having a slight touch of the same weather, "squalls with rain, thunder and lightning." The temperatures stood as follows:

	Water at surface.	Water at 50 fathoms.	Water at 100 fathoms.	Air.
8 A. M.	71.8°	71.8°	67°	70°
9 "	73			
10 "	75.5			
11 "	78.5			
12 "	78.5	77.5	72.5	76

79° was the highest temperature found, when at the same time it was 77° at 50 fathoms, and 74° at 100 fathoms. Its velocity, as felt by us in crossing this time, was 2.5 knots per hour, setting N. 77° E. We got out of it in latitude 36° 42′ N., longitude 72° 10′ W., bearing from the point of entrance N. 16° E. distant 78 miles: 78 miles, therefore, appears the breadth between these points of latitude and longitude.

The temperatures, on leaving it, stood as follows, the air being 66°:

3 A. M., water at surface 78°.

4 A. M., water at surface 74°, at 50 fathoms 70°, at 100 fathoms 64°.

5 A. M., water at surface 72°.

6 A. M., water at surface 71°.

Heading during these three hours N. W. by N. at the rate of three-and-a-half knots an hour. At 9 A. M. the water stood at surface 69°.5, at 50 fathoms 65°.5, at 100 fathoms 56°.5. By 1 P. M. the temperature at surface had fallen to 63°.5, at 50 fathoms to 58°.5, at 100 fathoms 58°, the temperature of the air being 68°.

When on sounding next day, June 1st, in latitude 39° N., longitude 70° 30′ W., the water showed as low as 51° at surface, and maintained an average temperature of 53° until we reached New York. This is a difference of 28° from the adjacent Gulf Stream. Shoals of porpoises and black fish were seen by us in the hot waters of the stream. We saw very little Gulf or sea weed (fucus natans) in it, but much at its outer edge. While mentioning this weed I may here remark, that we looked in vain, in the region assigned to the *Sargasso Sea*, for the great fields of it which have been reported. Small patches of five or six feet, generally arranged in long parallel lines in the direction of the wind, were seen daily in crossing the Atlantic till we reached the longitude of 28°, when it disappeared altogether. My frequent examinations of this weed satisfy me that, wherever it may originally come from, it feeds and grows upon the waters of the sea, which is certainly not more strange than the plant which feeds upon the air.

We discovered the *hot waters of the Gulf Stream* extending as far east as 73° 10′, in a latitude so far South as 33° 30′. The column of water temperatures in the "Abstract"* from May 23d to 29th, while engaged in the search for Ashton Rock, will satisfy you of this interesting and important fact; for you will notice that whenever we reached that longitude, in our various tracks between the latitudes 33° 30′ and 34° North, we experienced a sudden change of as much as 5° and 6° in the surface temperature—70° to 76°. This must be a branch or offset from the Gulf Stream, being so far to the eastward of the limits hitherto given to it *in those latitudes.* We first noticed this extraordinary change of temperature on the 23d—the temperature of surface water rising on that day from 71.5° to 79°. I cite from the Abstract:

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* *Vide* paper C.

Midnight, commencing 23d May, latitude 32° 35′ North, longitude 73° 24′; surface water 71.5°, at 50 fathoms 71.5°, 100 fathoms 67°.

8 A. M., latitude 32° 58′ North, longitude 73° 36′, surface water 73°.

9 A. M., latitude 32° 50′ North, longitude 73° 38′, surface water 75°, at 50 fathoms 73.5°, 100 fathoms 70°.

3 P. M., latitude 33° 03′ North, longitude 73° 52′, surface water 79°.

The current at 8 A. M. was found by trial to be one knot per hour, setting W. N. W., and the under-current (at 126 fathoms) one knot, setting to the E.; the current felt by the vessel (as determined by comparison of results of observations and dead reckoning) was 1.5 knots per hour, setting westerly; this was between 8 A. M. and 4 P. M. The variations of temperature of the water, recorded on the next day, (24th of May, in latitude 33° 25′, longitude 72° 40′, are worthy of notice—the sudden fall of 3½ degrees in one hour, from 6 to 7 P. M., 75.5° to 72°, while standing to the northward and eastward, and the rise again the next hour to 75°, made me suspect the possibility of a *shoal*, so that I put back, found the place again, and sounded with 300 fathoms line, but got no bottom. It being thick squally weather, I could not attempt deeper soundings.

The column of *specific gravity* of sea-water calls for some remarks. Our measurements by the hydrometer show that in some parts, if not in most parts of the ocean, the water is specifically *lighter* at depths than at surface, when reduced to like temperature—the correction for this difference being applied. I found on one occasion the following large difference: On December 8th, at surface 1028.6, (distilled water as standard held at 1000,) at 200 fathoms 1028.4; at 500 fathoms, 1027.2, all at 60° temperature: this was in latitude 31° 42′ North, longitude 38° 12′ West. The specific gravity generally found at surface appears about 1028.4 at 60° temperature; and this specific gravity at surface appears, according to our record, more variable than at depths.

The greatest *transparency* of the water observed, as found in its column, was seventeen fathoms, being able to see a large lead, painted white, at that depth. This was in latitude 21° 4′ N., longitude 66° 36′ W.

The column of *barometer* contains the records of the improved marine mercurial barometer, got from Tagliabue, in New York, which proved to be an excellent instrument, and most valuable to me, never failing to warn of an approaching gale. The Aneroid, though not noticed in the "Abstract," was regularly recorded in the Log, with the Mercurial, every four hours during the cruise. This may serve as a good test of its performance. It was set with the *mercurial* on leaving New York in October. It commenced at once to differ, indicating higher; and, though its daily fluctuations agreed well, this difference steadily increased until, by the time we got back to New York, seven months after, it had reached as high as six-tenths of an inch above it; thus acquiring an error of very nearly one-tenth of an inch a month. This leads me to doubt whether this ingenious instrument can ever be sufficiently trusted to take the place of the mercurial, though it is so much to be desired.

The observations for the *variation of the compass* could be taken but seldom with exactness, and therefore appear but seldom in the "Abstract;" the needle being generally kept by our jumping little schooner in too unsteady a state for correct azimuths.

In conclusion, I must express my regrets that the most important part of the "Instructions" was prevented being carried out by the bad condition of the schooner, proving, on overhauling at Porto Praya, quite unseaworthy. I allude to the investigations of the currents about Cape St. Roque, and of the volcanic region of the South Atlantic near the equator. But I sincerely trust that the work will not be allowed to stop here—that it will be continued under your instructions, in connection with your "*Wind and Current Chart,*" as has been authorized by Congress. The employment of three suitable vessels was recommended by the bill; but one has yet been employed, and that quite unsuitable in size and condition. A vessel of but one hundred tons, as is the "Taney," independent of being too unstable for the observations and the soundings, cannot carry officers and men enough for the incessant and laborious work required, nor provisions and water enough to keep the sea for long periods of time, as is essential on this service.

I have the honor to be, very respectfully, your obedient servant,

J. C. WALSH, *Lieut. U. S. N.*

To Lieut. M. F. Maury,

Superintendent of the National Observatory, Washington.

C.

ABSTRACT LOG OF THE "TANEY."

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude	CURRENT.		WIND.		CLOUDS.			Bar.
Month & Day.	Hour.			Set.	Velocity in knots per h.	Direction.	Force.	Kinds.	Portion.	Motion from	
1849. Oct. 28	Midn't.	° ′ ″	° ′ ″								
	8 A. M.						Calm.	Stra's & Cir. Strat.	6	Stationary.	30.16
	4 P. M.	40 36 00	73 53 30			S. S. E.	Light airs.	Cirro Strat.	9	Southward.	30.2
" 29	Midn't.	39 51	72 56 15			South.	Moderate.	Cirro Strat.	10	S'd & W'd.	30.15
	8 A. M.	39 36	71 59			S. S. E.	Fresh.	Cir. & Nimb.'	9	Southward.	30.10
	4 P. M.	39 15	72 12			S. S. E.	Fresh.	Nimb.	10	S. S. E.	29.83
" 30	Midn't.	39 16 40	72 20			S. E.	Gale.	Nimb.	10	S. S. E.	29.54
	8 A. M.	39 15	72 30	N. 40° W.	0.4	W. to N. W.	Gale.	Nimb.	10	Westward.	29.65
	4 P. M.	38 46 15	71 50			N. W.	Gale.	Cirro Cum.	8	N'd & W'd.	29.72
" 31	Midn't.	37 52	71 41			N. W. by N.	Gale.	Cum. & Nimb.	9	N'd & W'd.	29.86
	8 A. M.	37 26	71 27	N. 14° E.	1.25	W. N. W.	Fresh with squalls.	Cumulus	7	W. N. W.	29.91
	4 P. M.	36 40	70 59	Eastward.	3.6	W. N. W.	Gale.	Cirro Cum. Strat.	9	N. W.	29.92
Nov. 1	Midn't.	35 46	70 57 30			W. N. W.	Fresh with squalls	Cum. Stratus & Nimbus & Cirri.	8	S. & W. N'd and W'd.	30.02
	8 A. M.	34 20	71 10	N. 70° E.	2.0	N. W.	Fresh with squalls	Cum. Stratus.	9	N'd & W'd.	30.09
	4 P. M.	34 22	71 11 15	Eastward.	0.4	W. N. W.	Fresh with squalls	Cum. Stratus.	8	W. N. W.	30.16
" 2	Midn't.	33 34	71 5 30			N. W. by N.	Fresh.	Cum. Cir. & Nimb	9	W. N. W.	30.25
	8 A. M.	32 49	70 41	S. 8° W.	0.4	W. to N. W.	Fresh.	Cum. & Cum. Strat	10	Northward.	30.26
	4 P. M.	32 18	70 12	Westward.	0.8	N. N. E.	Moderate.	Cum. Stratus.	10	N'd & E'd.	30.22
" 3	Midn't.	31 56 30	70 3			N. N. E.	Moderate.	Cumulus.	8	Northward.	30.20
	8 A. M.	31 36	69 54	S. 20° E.	0.5	NW to N N E	Light airs.	Cum. Strat. & Cir's	3	S. W.	30.21
	4 P. M.	31 26	69 43	Eastward.	0.4	N. to N. N. E.	Light airs.	Cirrus.	1	S. S. W.	30.22

ieut. Joseph C. Walsh, Commander.

THERMOMETER.				Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.	REMARKS.
ir.	Water.							
	Surface.	50 fath's	100 fathoms.					
°	°	°						**Saturday, October** 27th, 1849.—Discharged the Pilot at 9 p. m. **Sunday, October** 28th, 1849.—At midnight took our departure—Northern light of Navesink bearing S. W., ½ W., distant 5 miles—Light Boat S. E. by E., distant 2 miles—At meridian Light Boat bore per compass N. E. ½ E., North light of Navesink W. by N., distant 4 miles—At 6 p. m. Navesink bore W. N. W.—Weather during this day pleasant—occasionally foggy. **Monday, October** 29th, 1849.—Weather damp and unpleasant, with a head sea—At 10 a. m. hove to and sounded in 75 fathoms, soft ooze—At 1 p. m., observing the *barometer falling rapidly* prepared for a gale of wind—Wind freshening with the fall of the barometer, with threatening appearances—At 5 p. m. hove to on part tack, under foresail, with bonnet off—heavy sea and blowing a gale—From 8 to midnight, a very heavy, short and broken sea—and schooner being very deep labored badly, and shipped a great deal of water—At 11 p. m., wind lulled for a moment and suddenly shifted from S. E. to S. W., with a heavy fall of rain—Barometer at its lowest point at time of the sudden shift. **Tuesday, October** 30th, 1849.—During this day until 8 p. m., fresh gales and cloudy with rain at intervals and a very heavy irregular and breaking sea—From 8 to midnight, gale moderated to fresh breezes with passing squalls—barometer steadily rising as per column. **Wednesday, October** 31st, 1849.—On the Western edge of Gulf Stream—Very ugly weather—From 4 to 8 a. m., fresh with heavy squalls accompanied by thunder, lightning, *hail*, *snow*, rain, and appearances of water-spouts—We saw to the Northward and Westward two columns of vapor rising from the sea to the clouds—From 8 to meridian moderate gales with heavy squalls and rain—The change of temperature of the water on getting into the Gulf Stream was remarkably sudden and great—At 8 a. m. it was 66°, and at 9 a. m. 73°, having run but 5 miles in the interval—At 10 a. m. 76°, at 11 a. m. 77°, the highest point during the day—At 6 p. m. it stood at 72°, having fallen gradually from noon—We suffered much with a very heavy irregular topping sea, which kept our decks flooded—Passed some sea-weed—*Portuguese men-of-war* and stormy petrels about us—The same bad weather continued throughout the day—From 8 to midnight, hail with rain accompanied the squalls, and a tremendous sea—Several rainbows and many water spouts were seen during the day—Weather would not permit sounding for deep sea temperatures. **Thursday, November** 1st, 1849.—From midnight to 8 a. m. squally weather and occasional rain with heavy head sea—Occasional rainbows—Passed some gulf weed—From 8 a. m. to 4 p. m. frequent heavy squalls with rain—Numerous rainbows and much gulf weed and stormy petrels—From 4 to 8 p. m. weather improving—hove to and sounded for temperatures—Six's self-registering thermometer at 280 fathoms up and down indicated minimum 58°, maximum 74°, agreeing with the temperature of the water brought up by the wooden cylinder from the some depth which gave 58°, the maximum indicated by Six's being 2° higher than the surface temperature—Gulf weed floating by—Ends with better weather and rising barometer. **Friday, November** 2d, 1849.—From midnight to 8 a. m., pleasant weather with heavy swell from Northward—passed a quantity of sea-weed—At meridian measured the specific gravity of surface water and found it as per column—At 1 p. m. hove to and tried temperatures with Six's thermometer, &c., at the depth of 100 fathoms, it indicated maximum 72.6° and 66.5°—A common thermometer in wooden cylinder with valves, indicated on being hauled up the same temperature at 100 fathoms as minimum by Six's, viz: 66.5°; at 50 fathoms, temperature 72°; transparency, 5 fathoms—Sea much rippied—Passed a quantity of sea-weed, and the first flying fish yet seen—At 7.30, tried temperatures as per column. **Saturday, November** 3d, 1849.—From midnight to 8, pleasant—Passed quantity of sea-weed—At 9 a. m. tried temperatures as per column—Picked up some sea-weed, on which were found many small
3.	55.							
7.	57.							
7.	57.							
9.	56.5							
1.	56.							
0.	58.							
4.5	56.							
5.	61.							
1.	62.							
54.	65.							
55.	76.							
4.	72.							
5.	71.5							
7.	72.	71.	280 fath's. 58°					
.	72.							
.	71.							
.	72.	72.	67	5, rippled.		1028.3		
5.5	72.	71.	67	14, smooth.				
6.	73.							
		72.	68		2°40′ W.			
71.	74.							

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.			Set.	Velocity in knots per h'r.	Direction.	Force.	Kinds.	Portion.	Motion from	Bar.
		° ′ ″	° ′ ″								
Nov. 4	Midn't.	31 14 00	69 20 00			S. E.	Light breeze.	Cumulus.	3	N'd.	30.21
	8 A. M.	31 7	68 42	N. 34° E.	0.7	N. E. ½ E.	Moderate.	Cumulus.	2	N'd. & E'd.	30.18
	4 P. M.	30 46	67 54	West'd.	0.4	N. E.	Moderate.	Cum. Stratus.	5	N'd. & E'd.	30.12
" 5	Midn't.	30 35 30	67 8			N. E.	Moderate.	Cir. Cum. Strat.	7	E'd.	30.11
	8 A. M.	30 19	67 4	S. 77° W.	1.7	N. E. by E.	Moderate.	Cir. Cum. Strat.	9	N'd.	30.11
	4 P. M.	30 5	66 36 40	East'd.	0.4	N. E. by E.	Fresh.	Cir. Cum. Strat.	8	N'd.	30.08
" 6	Midn't.	30 5 20	66 38			E. N. E.	Fresh.	Cir. Strat. & Cum.	8	N'd. & E'd.	30.00
	8 A. M.	30 16 20	66 43 15	N. 49° E.	0.12	N. E. by E.	Fresh.	Cum. Stratus.	9	N. E.	29.98
	4 P. M.	30 23	66 49	East'd.	1.0	N. E. by E.	Fresh.	Cir. Cum. Strat.	9	N'd. & E'd.	29.96
" 7	Midn't.	30 33	66 50			N. E. by E.	Fresh.	Cir. Strat. & Cum.	6	N'd. & E'd.	30.09
	8 A. M.	30 22 30	66 41	S. 30° E.	0.3	N. E. by N.	Fresh.	Cir. Cum. Stratus.	8	N. N. E.	29.99
	4 P. M.	30 8	66 21			N. E.	Moderate.	Cir. Cum. Stratus.	6	N. E.	30.00
" 8	Midn't.	29 58	66 57			N. E. by E.	Moderate.	Cum. Stratus.	4	N. E.	29.99
	8 A. M.	30 3	65 38	N. 19° E.	0.4	N. E. by E.	Moderate.	Cirro Cum. Strat.	7	N'd. & E'd.	29.97
	4 P. M.	30 31 30	65 23 30	East'd.	0.25	E. by S.	Light breezes.	Cirro Cum. Strat.	6	N'd. & E'd.	29.95
" 9	Midn't.	30 51	64 55			S. E. by E.	Moderate.	Cir. Cum. Strat.	3	Stationary.	30.04
	8 A. M.	31 3	64 52	S. 86° E.	1.0	S. E. by E.	Light breezes.	Cum. Stratus.	8	S'd. & E'd.	29.96
	4 P. M.	31 23	63 56			S. by W.	Moderate.	Cir. Cum. Strat.	6	S'd.	29.95
" 10	Midn't.	31 33	63 18			South	Light breezes.	Cum. Stratus.	5	Stationary.	30.03

Lieut. Joseph C. Walsh, Commander.

THERMOMETER.				Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.
Air.	Water.						
	Surface.	50 fath's	100 fathoms.				
°	°	°	°				
		74.	67				
70.	74.						
9.	74.	72.	68 90 fath's.				
75.	74.	71.	70°	11½		1028.3 100 fath. 1028.	
1.	74.	73.	68				
1.	73.5	75.5	70				
3.	75.	74.	76				
3.	75.5						
2.5	76.						
		74.5	68.5 350 fath's. 75.5° max. 67° min.	5, much rippled.		1028.5 350 fath. 1028.3	
5.	75.						
		70 f. ° 69.5	120 fath's. 65.8° 120 fath's. 65.8° by Six's.				
2.5	74.5						
2.	73.5						
		74.	69°				
3.	75.5	73.7	70	6, much rippled.			
2.	75.5						
		75.8	68.8	6, much rippled.			
2.5	75.5		120 fath's.		3° W.		
		75.	66.3°	8, much rippled.			
6.	75.5					1028.5	
2.	74.						
		71.	69				
).	74.						
		74.5	66.3	minimum. 11, smooth.			
7.	74.		200 fath's. 67.2°		7° W.	1028.7 100 fath. 1028.3	
		73.8	69.8				
3.	74.	74.	69.				

REMARKS.

crabs, a small gar fish and other very small fish, all of which were bottled for preservation as specimens—More *sea-weed* than yet seen—At noon tried specific gravity of sea water, as per column—From 4 to midnight pleasant—At 5 p. m., tried temperatures as per column—The self-registering Six's thermometer indicated near the same as those in the wooden cylinders, viz: at 100 fathoms minimum 67° maximum 76°—2° above surface temperature—Swell from the Nd.—water slightly phosphorescent—quantity of sea-weed.

SUNDAY, NOVEMBER 4th, 1849.—From midnight to 8 pleasant—At 6 p. m. hove to and tried temperatures as per column—Small patches of sea-weed in a decayed state passed us arranged in long parallel lines in the direction of the wind—schools of flying fish seen—swell from N. N. E.—At 1 p. m. tried temperatures as per column—At 6 p. m. hove to and tried temperatures as per column—Ends pleasant.

MONDAY, NOVEMBER 5th, 1849.—At 6 a. m. sounded for temperatures as per column—much sea-weed—many flying fish—At 2.30 p. m. sounded for temperatures as per column, the common thermometer in wooden cylinders agreeing with Six's—Heavy sea running from N. E.—At 6, hove to in a blow from N. E. with very heavy head sea.

TUESDAY, NOVEMBER 6th, 1849.—During this day lying to against a heavy head sea and strong N. E. wind—At 11 a. m. took the temperatures of the water as per column—At 5.50 took temperatures as per column—Passed many patches of sea weed—The sea very phosphorescent.

WEDNESDAY, NOVEMBER 7th, 1849.—During this day pleasant weather—At 9 a. m. sounded for temperatures as per column—Some sea-weed—swell from the N. E.—At 4 p. m. took temperatures as per column.

THURSDAY, NOVEMBER 8th, 1849.—Midnight, to 8 a. m., pleasant, with a slight N. E. swell—At 6.30, sounded for water temperatures as per column—8 a. m. to 4 p. m. pleasant—At 1, tried temperatures as per column—Bunches of sea-weed floating by—4 to 8 pleasant—passed larger and more numerous patches of sea-weed than yet seen—Dolphins, flying fish and a flock of Oceanic birds were seen—The lower range of clouds "Stratus" was observed to move rapidly to the S. W., while the upper range "Cirrus" remained stationary, and also, the "Cumulus" stationary about the horizon—At 7 p. m. took temperatures—water phosphorescent—Ends with heavy swell from N. E.

FRIDAY, NOVEMBER 9th, 1849.—Commences pleasant—At 4 a. m. sounded for temperatures as per column—Swell from S. E. and lightning to the W'd.—At 1 p. m. sounded for temperatures as per column—Some sea-weed and flying fish—Swell from the S'd. at 4 p. m.—At 7 p. m., sounded for water temperatures—From 8 to midnight lightning along the Western horizon—Water phosphorescent—at midnight sounded for temperatures as per column.

SATURDAY, NOVEMBER 10th, 1849.—Commences pleasant with squally appearances—a light shower of rain at 6 a. m.—Lightning in the Northern horizon—At 6.30, a rainbow to the N. W., which lasted until 7—Passed many patches of sea-weed—At 9 sounded for water temperatures as per column—At 5, being calm, tested "*Maury's Sounding Indicator*," and after several trials at various depths, found its indications to be nearly correct—but 5 fathoms error in 100 fathoms up and down—From 6 to 8, a long S. E. swell and lightning along the horizon—8 to midnight, lightning at the S'd. and E'd.—A long swell from S'd. and E'd.—At 6, sounding for water temperatures as per column.

SUNDAY, NOVEMBER 11th, 1849.—Commences with squally appearances and occasional showers of rain—Lightning to the northward and to the southward and eastward—At 9 a. m., tried temperatures as per column—At 6 p. m. lightning to the eastward—passed much sea-weed during the day—At midnight took temperatures as per column—A long irregular swell from the northward and eastward.

MONDAY, NOVEMBER 12th, 1849.—Commences pleasant, with a long irregular swell and lightning about the horizon from S. to E.—From 4 to 8 a. m. a shoal of porpoises about the schooner—At 1 p. m. took temperatures as per column—At 9 p. m., took temperatures as per column—Passed a quantity of gulf-weed during the day—A heavy irregular swell.

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude	CURRENT.		WIND.		CLOUDS.			Bar.
Month & Day.	Hour.			Set.	Velocity in knots per h.	Direction.	Force.	Kinds.	Portion.	Motion from.	
		° ′ ″	° ′ ″								
Nov. 10	8 A. M.	31 44 30	62 54	N. 84° W.	0.5	S. S. W.	Light breezes.	Cum. Stratus.	6	S'd. & W'd.	30.04
	4 P. M.	31 43	62 32	East.	0.4	W. S. W.	Light airs.	Cum. Stratus.	8	S'd.	30.04
" 11	Midn't.	31 44 00	62 30				Calm.	Cum. Stratus.	5	W. N. W.	30.03
	8 A. M.	31 43	62 30	S. 77° W.	0.75	North.	Very light.	Cirro Stratus.	6	Southward.	30.02
	4 P. M.	31 44	62 08	East.	0.4	N. E.	Very light.	Cirro Stratus.	9	S. E. & N. E.	30.02
" 12	Midn't.	31 46	61 44			East.	Light breeze.	Stratus.	3	Southward.	30.01
	8 A. M.	31 47 30	61 32 30	S. 80° W.	0.6	N. by W.	Light breeze.	Cirro Stratus.	3	N. W.	30.00
	4 P. M.	31 51 30	59 57	West.	0.6	W. N. W.	Light breeze.	Cirro Cum. Strat.	8	N'd & W'd.	29.97
" 13	Midn't.	31 57	60 17			W. N. W.	Light breeze.	Stratus.	5	Westward.	29.99
	8 A. M.	32 02	59 44	N. 10° E.	0.1	W. N. W.	Light breeze.	Cirro Cum. Strat.	6	N'd & W'd.	29.99
	4 P. M.	32 27 30	59 18 15			N. W.	Moderate.	Cum. Stra.& Nim.	7	N. N. W.	29.97
" 14	Midn't.	32 58 30	59 00			N. W.	Mod. with squalls.	Cum. Stratus.	6	Northward.	30.00
	8 A. M.	32 32 30	58 50 30	S. 22° E.	0.8	NW to NNE.	Light breeze.	Cum. Stra.& Nim.	5	Northward.	30.03
	4 P. M.	32 21	58 31 10	Eastward.	2.	N. N. E.	Light breeze.	Cumulo Stratus.	7	N'd & E'd.	30.03
" 15	Midn't.	32 8 00	58 36 00	Westward.		NNE & NW.	Moderate.	Stratus.	2	N. N. E.	30.05

ieut. Joseph C. Walsh, Commander.

THERMOMETER.				Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.	REMARKS.
Air.	Water.							
	Surface.	50 fath's	100 fathoms.					
°	°	°	°					
2.	74.	74.	68.8	14, smooth.				**Tuesday, November 13th, 1849.**—Commenced this day the search for the "False Bermudas,"—At 5 a. m. took temperatures as per column—At 11 a. m. a squall of wind and rain from N. W.—At 3 p. m. sounded with 550 fathoms, *line* up and down; no bottom; and took temperatures as per column—The two Six's thermometers at 450 and 550 fathoms came up out of order—The markers had penetrated the mercury—From meridian to 4 p. m. two small land birds flew on board—At 6 p. m. sounded with 200 fathoms up and down; no bottom; and took temperatures as per column—At 8 p. m. sounded with 200 fathoms up and down; no bottom; and took temperatures as per column—At midnight sounded with 100 fathoms up and down; no bottom; and took temperatures as per column—Passed during the day numerous bunches of sea-weed—several shoals of flying-fish—Ends squally with rain.
7.	74.				4°20′ W.			
		71.	69.					
2.	73.5	71.5	69.					
1.	73.	73.5	67.5					
3.	73.5							
1.	73.	73.8	68.5					**Wednesday, November 14th, 1849.**—"*In search of the False Bermudas*"—At 4.30 a. m. sounded with 100 fathoms; no bottom; and took temperatures as per column—At 11 a. m. sounded with 300 *fathoms;* no bottom; and took temperatures as per column—(Position of this sounding, latitude 32° 21′ N., longitude 58° 48′ W.)—At 3 p. m. sounded with 800 fathoms, line up and down; no bottom; (in latitude 32° 22′ N., longitude 58° 31′.30 W)—The Six's thermometer at 800 *fathoms,* came up *broken;* the temperature, at 800 fathoms by thermometer, in wooden cylinder, 63°, (0.5° deducted for correction as per column,) the cylinder came up *split through* and compressed in the middle and otherwise distorted by the pressure at that great depth—Passed numerous bunches of sea-weed, but no indications whatever of rocks or shoal water—(Position at 6h. 30m., p. m., latitude 32° 24′ N., longitude 58° 19′ W.)—At midnight, sounded with 200 fathoms, up and down; no bottom; and took temperatures as per column—Ends pleasant weather.
1.	73.5							
6.	73.	73.8	68.4	5, much rippled.				
1.	72.5	72.5	68.2					
0.5	72.5	72.8	68.5		8°30′ W.			
			350 fath's. 64.8° 250 fath's. 68.5°					**Thursday, November 15th, 1849.**—*In search of the False Bermudas.*—Commences pleasant, with light variable airs—From 8 a. m. to meridian, weather being favorable and every indication of its continuance, and the sea smoother than we have yet had it—All hands employed in getting up and shipping the wire reel and stand, and the fair leader over the stern, preparatory to sounding—A 9h. 30m., a. m., lowered a boat and tried the current, found a very slight drift to W. S. W.—At 1h. 25m., p. m., started the wire machine, and at 2h. 55m. p. m., had reeled off 5,700 fathoms, *dead up and down,* without striking bottom, when the wire parted at one of the links on the reel—We had observed some of the links of this large sized wire to catch at times on others upon the reel, endangering a break, and in consequence, at the time it parted, we were reeling off very slowly and carefully checking it by the friction band, which worked admirably—A link going off the reel caught in another under it upon the reel and before it could be extricated, it snapped in the middle of the link This was the largest sized wire, No. 7—The whole time of reeling off, the wire went down *perfectly plumb*—it served as an anchor to keep the vessel steady, and there was at no time a variation of one-half a degree from the "*plumb*"—We were highly encouraged, expecting to strike bottom every moment, and our sorrow and disappointment upon the break and loss of the wire, great indeed—The immense depth of 5,700 *fathoms* we believe to be the greatest depth of the ocean *ever yet measured*—There would have been no difficulty in reeling it up—We had tried several times, the last time at 5,000 fathoms, and found that 4 men by the aid of our powerful machine, could reel up with perfect ease—It would no doubt have taken much time, (20 or 24 hours,)—The position of this sounding was by a number of sets of morning, noon and afternoon observations in latitude 31° 59′ N., longitude 58° 43′.25 W., it being calm throughout the time and no change in position—This position is in the immediate vicinity of the assigned position of the rocks called the False Bermudas, for which we are in search—Unshipped and struck the wire sounding-apparatus below—While doing so the schooner commenced rolling and a davit in the starboard side to which one of the guys was made fast, *drew* and the
4.	72.	72.5	70.8	6, much rippled.		1029.5gr.	550	
		73.5	140 fath's. 67°			500 fath's 1028.8gr.	200	
			90 fath's. 72.5°					
.	72.8	71.5	200 fath's. 67°					
			100 fath's. 67°					
.5	72.5	72.7	67					
			71	10, rippled.				
		73.2	300 fath's. 63°				300	
2.	72.5						800	
			800 fath's. 62.5°					
0.	73.		130 fath's. 72.8°				200	
			200 fath's. 66°					

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.			Set.	Velocity in knots per. h.	Direction.	Force.	Winds.	Portion.	Motion from.	Bar.
		° ′ ″	° ′ ″								
Nov. 15	8 A. M.	32 1 00	58 42	S. 16° E.	0.8	N. to N. N. W	Light var.. airs.	Cum. Stratus.	3	Northward.	30.07
	4 P. M.	31 59	58 44 30				Calm.	Cum. Stratus.	3	Stationary.	30.07
16	Midn't.	32 10	58 59			S. W.	Very light breeze.	Cum. Stra. & Nim.	9	S'd & E'd.	30.00
	8 A. M.	32 15	57 07 30				Calm.	Cum. Stratus.	10	Stationary.	29.97
	4 P. M.	32 21	59 6			N. E.	Gale.	Nimbus.	10	N'd & E'd	29.95
" 17	Midn't.	32 8	59 17			E. N. E.	Gale.	Nimbus.	10	N. E.	29.94
	8 A. M.	32 35	59 32	N. 65° W.	0.3	East.	Gale.	Nimbus.	10	E. N. E.	21.29
	4 P. M.	32 40	59 41	West.	0.3	East.	Gale.	Cum. Stra. & Nim.	10	E. N. E.	29.92
" 18	Midn't.	32 25	59 50			E. N. E.	Gale.	Cum. Stra. & Nim.	10	N'd & E'd.	29.92
	8 A. M.	32 19 30	59 56	S. 30° W.	0.3	E. N. E.	Gale.	Nimbus.	10	East.	29.91
	4 P. M.	32 14	60 6			E. S. E.	Gale.	Nimbus.	10	S'd & E'd.	29.83
" 19	Midn't.	32 13	60 15			S. E.	Gale.	Nimbus.	10	S. S. E.	29.79
	8 A. M.	32 17	60 00			S. S. E.	Moderate.	Cir. Cum. Stra. & Nim.	8	S. & N. W.	29.82
	4 P. M.	32 20	59 00 20	S. 31° E.	0.2	S. W.	Moderate.	Cum. Stratus	6	S. W.	29.79
" 20	Midn't.	32 30	58 31			W. by S.	Moderate.	Cir. Cum. Stratus.	3	S'd & W'd.	29.89
	8 A. M.	32 44	58 11	N. 59° W.	1.3	West.	Light breeze.	Cum. & Cir. Stra.	3	N'd & W'd.	29.93
	4 P. M.	32 34	57 51			S. W.	Moderate.	Cir. Cum. Stra.	6	Westward.	29.33
" 21	Midn't.	32 9	57 23			S. S. W.	Light breeze.	Cirr. Stratus.	3	S'd & W'd.	29.93
	8 A. M.	32 3	57 33	N. 17° E.	0.8	S. by W.	Moderate.	Cum. Stratus.	5	Southward.	29.95
	4 P. M.	31 49 30	55 41	East.	0.3	S. by E.	Moderate.	Cir. Cum. Stra.	9	Southward.	29.91
" 22	Midn't.	31 31	56 8			S. ½ W.	Moderate.	Cum. Stratus.	9	Southward.	29.85
	8 A. M.	31 34	55 49	N. 70° E.	1.0	South.	Light breezes, with squalls.	Cir. Cum. Stra. & Nim.	10	Southward.	29.72
	4 P. M.	31 27	55 53			Southward.	Light variable airs	Nimbus.	9	S'd & N'd & Wst'd.	29.69

. *Joseph C. Walsh, Commander.*

'HERMOMETER.			Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.
Water.						
ur- ace.	50 fath's	100 fathoms.				
○	○	○				
3.						
						5700
3.5						
3.						
3.	72.8	67.	9, rippled.			
2.8		68.				
2.8						120
2.		69.				112
	70f's	120 fath's.				
	72.2	67.3°				120
2.						
2.						
	71.5	67.				
2.						
2.5						
2.5						
	73.	67.				
2.						
2.5	73.3	67.5				
						300
	73.2					
2.5	72.					200
		80 fath's.				
		69.5°				
						200
		120 fath's				
					Surface.	
2.5		68.2°				
					1029.4gr.	
		800 fath's.			800fath's	
						800
		61.0			1028.5gr.	
3.				7°30' W.		
	71.2	68.5				
3.						
		69.				
3.				6°20' W.		
	71.8	70.5				
3.	72.	70.2				
3.						
3.						
	72.7	66.2				200
3.	72.4	67.				200

REMARKS.

heavy reel surged violently three or four times from side to side—Mr. Marcy, the master, while attempting to get hold of the guy, was struck and knocked down by the reel, whereby his right collar bone was fractured—The hammock nettings on both sides were shattered by the reel surging against them—It was lowered upon deck as soon as possible, and afterwards struck below without further accident, though with much difficulty—The wire had nothing attached to it but a 10 lb. lead with "*Stellwagen cone*" and "*Maury's Indicator*"—regretted much the loss of the last—Noticed dolphin, flying-fish, lugger-fish, and numerous patches of sea-weed during the day—At 10h. 30m. p. m., a squall from W. S. W. with rain—Ends pleasant.

FRIDAY, NOVEMBER 16th, 1849.—*In search of the "False Bermudas."*—Commences with rain—At 11 a. m. took temperatures as per column—From meridian to 4, rain with fresh gales—hove to at 2 p. m. under fore-sail with bonnet off—Barometer falling, and heavy sea getting up—Took temperatures at 5 as per column—Ends with a gale from East—heavy sea and rain—water phosphorescent—At midnight, sounded with 120 fathoms, no bottom.

SATURDAY, NOVEMBER 17th, 1849.—*In search of the "False Bermudas."*—Throughout this day, hove to, in a strong gale of wind and rain, with a very heavy sea from the eastward—Schooner very wet and uncomfortable, as usual—Sounded at 6h. 30m., a. m., 112 fathoms, no bottom; and took temperatures as per column—At 1 p. m. sounded with 120 fathoms, no bottom; and took temperatures as per column—At 10 p. m. sounded with 110 fathoms, no bottom; and took temperatures as per column—Passed much sea-weed.

SUNDAY, NOVEMBER 18th, 1849.—*In search of the "False Bermudas."*—Commences with very bad weather and wind unsteady—At times light and then in heavy squalls with rain, with a heavy head sea—From 8 a. m. to 4 p. m., stormy weather and occasional showers of rain—frequent heavy squalls—Schooner laboring badly and very wet, as usual—From 4 to 6 p. m., scud passing from the southward and westward—From 6 to 8 heavy squalls of wind and rain with lightning to the southward and eastward—From 8 to midnight, blowing in heavy squalls—At midnight raining in torrents, very thick with frequent flashes of vivid lightning, all around the horizon—During the whole day, lying to on port tack and drifting bodily to leeward—At 11 p. m. observing the wind to be hauling and heading us off into the trough of the sea; wore ship, and found schooner lay to more easy on starboard tack—Passed during the day quantities of sea-weed, arrayed in long parallel lines in the direction of the wind.

MONDAY, NOVEMBER 19th, 1849.—*In search of the "False Bermudas."*—Weather moderating—Barometer rising slowly—Midnight until 4 a. m. wind unsteady with squalls, with rain and lightning—took temperatures as per column—From 4 to 8 a. m. moderate—8 to meridian, pleasant—At 8, made sail in continuation of search for the "False Bermudas"—Swell from the S. W.—At 11 a. m. took temperatures as per column—At 5.30 p. m., sounded with 300 fathoms, up and down, *no bottom;* and temperatures, as per column—From 6 to 8, lightning to the northward, and water phosphorescent—At midnight, sounded with 200 fathoms, *no bottom;* temperatures as per column—Passed during the day numerous patches of sea-weed—Ends pleasant, with swell from the westward.

TUESDAY, NOVEMBER 20th, 1849.—In search of the "False Bermudas."—At 4 a. m., sounded with 200 fathoms, *no bottom;* and took temperatures as per column—At 7.30 a. m. hove to for sounding—From 8 to meridian, employed sounding with 800 fathoms line, up and down, *no bottom*—Wooden cylinder containing thermometer came up crushed in consequence of the pressure, and the thermometer showed surface temperature—took specific gravity of sea water at 800 fathoms, brought up by metal cylinder, and also at surface as per column—The water in metal cylinder from 800 fathoms showed temperature 62°, one degree is subtracted, being the correction for change in hauling up—At 4.20 p. m. found that the fly of Maury's patent log had twisted off—Put on a new one and set it again—At 8 p. m. sounded

Abstract Log—U. S. Schooner

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.		
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h.	Direction.	Force.	Kinds.	Portion.	Motion from
		° ′ ″	° ′ ″							
Nov. 23	Midn't.	31 4	55 54			W. N. W.	Moderate.	Cum. Stratus.	6	Westward.
	8 A. M.	31 1	55 59			N. W.	Moderate.	Cumulus.	4	N. W.
	4 P. M.	31 19	55 46 30	N. 67° E.	0.7	N. by E.	Fresh.	Cumulus.	7	N'd and E'd.
" 24	Midn't.	31 26	55 50			N. by E.	Fresh.	Cum. Stratus.	6	N'd and W'd.
	8 A. M.	31 9	56 8			N. N. E.	Fresh.	Cum. Stratus.	8	Northward.
	4 P. M.	30 56	56 31	East.		N. by E.	Fresh.	Cum. Stratus.	7	N'd and W'd.
" 25	Midn't.	31 00	56 50			N. by E.	Fresh.	Cum. Stratus and Nimbus.	6	N. N. E.
	8 A. M.	30 52	57 20			N. E. by N.	Gale.	Cum. Stratus and Nimbus.	7	N. E.
	4 P. M.	30 53	57 27			N. E.	Gale.	Cum. Stratus.	9	N. N. E.
" 26	Midn't.	30 52 30	57 34			N. E.	Gale.	Cum. Stratus.	6	N. E.
	8 A. M.	30 54	57 57	N. 86° W.	0.8	N. E.	Gale.	Cum. Stratus.	8	N. E.
	4 P. M.	31 5 30	58 1			N. E.	Fresh.	Cum. Stratus.	8	N. E.
" 27	Midn't.	31 36	58 4			E. by N.	Fresh.	Cum. Stratus.	9	East.
	8 A. M.	31 52	58 5	N. 45° W.	0.9	E. S. E.	Light breezes.	Cirro Stratus.	9	S. E.
	4 P. M.	31 58 40	57 40			S. E. by S.	Moderate.	Cir. Cum. Strat.	9	East.
" 28	Midn't.	32 00 40	57 23			S. E.	Light airs.	Cum. Stratus.	10	S. W.
	8 A. M.	31 50	56 46 15	N. 45° W.	0.7	S. by W.	Moderate.	Cirro Cumulus.	8	Southward.
	4 P. M.	31 26	56 7			S. S. W.	Moderate.	Cirro Stratus.	4	S. W.
" 29	Midn't.	31 20	55 34			S. by W.	Moderate.	Cirro Cumulus.	9	S'd. & W'd.
	8 A. M.	31 30	54 40	N. 15° W.	1.0	S. by W.	Moderate.	Cirro Stratus.	9	Southward.
	4 P. M.	31 30	53 44			S. by W.	Moderate.	Cir. Cum. Stratus and Nimbus.	9	Southward.
" 30	Midn't.	31 46	53 10			W. N. W.	Moderate.	Cirro Stratus.	8	Westward.

ieut. Joseph C. Walsh, Commander.

THERMOMETER.				Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.	REMARKS.
Air.	Water.							
	Surface.	50 fath's	100 fathoms.					
°	°	°	°					
8.	72.5		67.				130	with 100 fathoms, and took temperatures as per column—Passed during the day much sea-weed, arranged in parallel lines in direction of the wind as usual, also noticed many flying-fish and dolphin—Ends pleasant, with a S. W. swell. Wednesday, November 21st, 1849—Commences pleasant—At 2 a. m. sounded for temperatures, as per column—At meridian sounded for temperatures as per column—At 4.40 p. m. sounded for temperatures as per column—Swell from the southward throughout the day. Thursday, November 22d, 1849.—*Commenced search for "Nye's Rock."*—Commences squally with rain—From 8 a. m. to meridian, rainy weather with short irregular sea—At 10.30 a. m. sounded with 200 *fathoms, no bottom ;* and took temperatures as per column—From 4 to 6 p. m. squalls of wind and rain—At 8 p. m. sounded with 200 *fathoms*, no bottom ; and took temperatures as per column—At midnight sounded with 130 *fathoms*, no bottom ; and took temperatures as per column—Wooden cylinder at 130 *fathoms*, came up *empty*—Ends pleasant, with swell from the westward. Friday, November 23d, 1849.—*In search of "Nye's Rock."*—Commences pleasant—squally appearances—At 4 a. m. sounded with 250 *fathoms, no bottom;* swell from the westward—Passed numerous patches of sea-weed—At 10 a. m. sounded with 300 *fathoms*, no bottom ; temperatures as per column—Passed a small piece of drift-wood, and patches of sea-weed—Meridian to 4 p. m. squally with occasional rain—At 3 p. m. sounded with 300 *fathoms*, no bottom—large quantities of sea-weed floating by—a heavy sea running from N. W.—From 4 to 6, frequent heavy squalls with rain—At 6 p. m. hove to—sounded with 200 fathoms, no bottom ; temperatures as per column—At 8 p. m. made sail again. Saturday, November 24th, 1849 —"In search of Nye's Rock."—Commences pleasant, with squally appearances and N. W. swell—At 4 a. m. sounded with 200 *fathoms, no bottom ;* the lower cylinder came up empty, temperatures as per column—From 8 to meridian, squally with occasional rain—At 11.30 a. m. sounded with 200 *fathoms*, no bottom; temperatures as per column—heavy sea running from N. W.—At 5.30 p. m. sounded with 200 *fathoms*, no bottom ; temperatures as per column—From 6 to 8, wind blowing in heavy puffs and threatening appearances—Passed a quantity of sea-weed during the day, arranged in long parallel lines, in direction of the wind—Also flying-fish and some oceanic birds. Sunday, November 25th, 1849.—*In search of "Nye's Rock"*—Commences with rain and squalls, and heavy sea—From 8 a. m. to 4 p. m., frequent hard squalls with rain—Several rainbows—4 to midnight, weather moderating, but occasional heavy squalls with rain—At 5, sounded with 200 fathoms, no bottom—Heavy sea running from N. E. throughout the day—Passed much sea-weed. Monday, November 26th, 1849.—*In search of "Nye's Rock"*—Commences, and until 4 p. m. squally weather, with occasional rain and heavy N. E. swell—Much sea-weed and oceanic birds—At 8 a. m., took temperatures as per column—From 4 to 6 p. m., some grey gulls were seen—Ends pleasant. Tuesday, November 27th, 1849.—*In search of "Nye's Rock*—Commences pleasant—Made sail in continuation of search for "*Nye's Rock*"—At 11.15 a. m., took temperatures as per column—Noticed much sea-weed, and several birds of the kind called "Boobies and Boatswains"—Ends pleasant, with a long swell from the Eastward. Wednesday, November 28th, 1849.—*In search for "Nye's Rock"*—At 6 a. m., sounded with 100 fathoms, no bottom—At 1 p. m., sounded with 200 fathoms, no bottom ; and took temperatures as per column—Cylinder at 200 fathoms came up empty—At 8 p. m. sounded with 600 fathoms line, no bottom—Cylinder at 300 and 600 came up with water, shewing surface temperature—At 8.30 p. m., filled away and stood to the Eastward—passed much sea-weed during the day, arranged in parallel lines in direction of the wind—but no indication whatever of the vicinity of rocks or shoals.
							250	
8.	72.						300	
		72.3	68.	9, rippled.				
70.	72.							
		72.5	68.				200	
8.	72.							
		71.					200	
8.	72.							
		72.	69.				200	
71.	72.							
		71.	67.5				200	
8.	72.	71.	67.5					
68.	72.							
71.	72.5	72.						
							200	
69.	72.							
68.	72.							
		70.	69.					
70.	72.							
69.	71.							
68.	71.5							
		71.3	67.	5, much rippled.				
71.	71.5							
69.5	71.6							
		71.	67.					
70.	72							
		72.					200	
75.	71.8						600	
72.	71.6	71.						
		71.	68.				200	
72.	71.5				10°30′W			
		71.						
74.	71	70.5	68.	10, rippled.		1029		
70.	71	70.5						

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h.	Direction.	Force.	Kinds.	Portion.	Motion from	Bar.
		° ′ ″	° ′ ″								
Nov. 30	8 A. M.	31 44	51 51	N. 4° W.	0.9	S. S. W.	Fresh.	Cirro Stratus.	10	S. W.	30.06
	4 P. M.	31 47	51 4			S. S. W.	Fresh.	Cir. Cum. Stratus and Nimbus.	10	S. W.	30.09
Dec. 1	Midn't.	31 52	50 51			N. N. W.	Light breeze.	Nimbus and Cum. Stratus.	10	S. W.	30.10
	8 A. M.	31 59	49 48			S. W.	Moderate.	Nimbus and Cirro Cum. Stratus.	10	S'd. & W'd.	30.12
	4 P. M.	32 00	49.13			S. S. E.	Light breezes.	Nimbus.	10	Southward.	30.12
" 2	Midn't.	32 00	48 50			S. S. E.	Light breezes.	Nimbus.	10	Southward.	30.12
	8 A. M.	32 24	48 26	N. 53° W.	0.5	S. E.	Moderate.	Cum. Stratus.	8	S'd. & E'd.	30.22
	4 P. M.	32 25 20	47 50	Westward.	0.5	South.	Moderate.	Cir. Cum. Strat.	5	Southward.	30.18
" 3	Midn't.	32 25	47 1			S. by E.	Moderate.	Cum. Stratus.	6	Southward.	30.24
	8 A. M.	32 20	46 20	N. 55° E.	0.5	Southward.	Light breezes.	Cirro Stratus.	5	Southward.	30.26
	4 P. M.	32 31	46 4	Eastward.	0.5	South.	Light airs.	Cirro Stratus.	4	Southward.	30.27
" 4	Midn't.	32 31	45 52			Northward.	Lt. variable airs.	Cir. Strat. & Nim.	8	S'd. & E'd.	30.30
	8 A. M.	32 29 40	45 44	S. 45° E.	0.1	Southward.	Var. light breezes.	Cum. Stratus.	5	S. E.	30.24
	4 P. M.	32 29 30	45 20 15	Eastward.	0.5	South.	Light breezes.	Cir. Cum. Strat.	4	Southward.	30.25
" 5	Midn't.	32 27	44 37			South.	Light breezes.	Cum. Stratus.	6	Southward.	30.15
	8 A. M.	32 30	43 43	N. 20° W.	0.5	S. by W.	Moderate.	Cum. Stratus.	5	Southward.	30.09
	4 P. M.	32 27	42 40			S. S. W.	Moderate.	Cumulus.	3	Southward.	30.07
" 6	Midn't.	32 20	41 44			S. S. W.	Moderate.	Cum. Stratus.	4	Stationary.	30.11
	8 A. M.	32 9	40 42	S. 76° E.	0.2	S. S. W.	Mod. with squalls.	Cum. Stratus.	7	S. S. W.	30.13
	4 P. M.	32 10 30	40 13 30			S. W.	Light breezes with squalls.	Cum. Stratus.	8	S. W.	30.14
" 7	Midn't.	32 00	39 35 30			S. S. W.	Moderate.	Strat. & Nim.	4	Southward.	30.20

Lieut. Joseph C. Walsh, Commander.

THERMOMETER.				Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.	REMARKS.
Air.	Water.							
	Sur face.	50 fath's	100 fathoms.					
°	°	°	°					
1.	71.	71.	68.					THURSDAY, NOVEMBER 29th, 1849.—*In search of "Nye's Rock"*—From midnight to 8 a. m., pleasant—At 4 a. m., sounded with 200 fathoms, no bottom; and took temperatures as per column—A long swell from the Southward—8 a. m. to 4 p. m., pleasant—At 9 a. m. sounded with 100 fathoms, no bottom; and took temperatures as per column—At 3.30 p. m., sounded with 100 fathoms, no bottom; and took temperatures as per column—From 4 p. m. to 6 p. m., rainy weather, with squally appearances, and a long swell from N. W.—At 11.30 p. m., sounded with 100 fathoms, no bottom; and took temperatures as per column—Ends pleasant—Passed quantities of sea-weed during this day.
3.	71.							
		69.5	66.5					
9.	71.							
		72.	67					
0.	71.							
2.	71.5	72.	68	7, rippled.				FRIDAY, NOVEMBER 30th, 1849.—Commences, and until 8 a.m., pleasant, with a swell from N. W.—At 8 a. m., sounded for temperatures as per column—8 a. m. to 4 p. m., rainy weather, with squally appearances, and a S. W. swell—At 3 p. m., wind suddenly shifted to N. N. W., with heavy rain—4 p. m. to midnight, squally appearances, with frequent heavy showers of rain—Swell from S. W.—At 10 p. m., sounded for temperatures as per column.
0.	72.							
70.	71.	71.	67.		12° W.			SATURDAY, DECEMBER 1st, 1849.—Commences with, and until 8 a. m., rainy weather, with squally appearances—At 6 a. m., took temperatures as per column—8 a. m. to 4 p. m., drizzling rain, with swell from S. W.—From 4 to midnight, rainy, with swell from Southward—At 4, sounded for temperatures as per column—noticed less sea-weed during this day than usual.
		72.	67.	10, slightly rippled.				
75.	71.3							
71.	71.							SUNDAY, DECEMBER 2d, 1849.—Commences with, and until 8 a. m., pleasant, with a swell from the Southward—At 7.30 a. m., sounded for temperatures as per column—From 8 a. m. to 4 p. m., pleasant—At 1.30 p. m., sounded for temperatures as per column—Ends pleasant.
		71.6	66.2					
70.	71.2				13° W.			
75.	71.5				13° W.	1029.		MONDAY, DECEMBER 3d, 1849.—Commences, and until 8 a. m., pleasant, with a swell from the Southward—At 3 a. m., sounded for temperatures as per column—At 8 a. m. to 4 p. m., pleasant—A shower of rain at 10.30—Noticed that there is but very little sea-weed floating past, and that in small detached bunches—From 4 p. m. to midnight, pleasant, with southerly swell—At 6 p. m., sounded for temperatures as per column—At 9.30 p. m., two fin-back whales, and a shoal of porpoises—At 10.50 p. m., wind came E. S. E., with a shower of rain—noticed a brilliant lunar rainbow lasting 20 minutes.
		71.5	66.					
70.	71.							
67.	71.				14° W.			
						1028.8		TUESDAY, DECEMBER 4th, 1849.—Commences with, and until 8 a. m., pleasant weather—Swell setting from the westward—8 a. m to 4 p. m., pleasant, with a N. W. swell—noticed a few bunches of sea-weed—4 p. m., to midnight, pleasant—At 6 p. m., sounded for temperatures as per column—At 11.30 p. m., sounded for temperatures as per column—Water phosphorescent.
76.	71.							
			65.					
71.	70.5	70.	65.5					
69.	70.	70.5	66.		16° W.			WEDNESDAY, DECEMBER 5th, 1849.—Commences, and until 8 a. m., pleasant, with a long N. W. swell—At 8, sounded for temperatures as per column—Saw a shoal of black fish, albacore and flying fish, and a few bunches of sea-weed—8 a. m. to 4 p. m., pleasant, with a swell from N. W.—At 1 p. m, sounded for temperatures as per column—Threw overboard a "*current bottle*," with date, latitude and longitude, and request to report time and place where picked up—From 4 p. m. to midnight, pleasant, with a W. N. W. swell—At 5.40, sounded for temperatures as per column—At 11, sounded for temperatures as per column.
		69.5	66.5	7, rippled.				
73.	70.				16° W.			
		69.2	65.5					
9.	69.5	69.	65.					
		69.5	65.5					THURSDAY, DECEMBER 6th, 1849.—Commences pleasant—From 4 to 8 a. m., squally—At 3.30 a. m., sounded for temperatures as per column—A swell from the southward—From 8 a. m. to 4 p. m., squally appearances—several squalls of rain—At 10 a. m., sounded for temperatures as per column—Saw a fin-back whale—noticed more sea-weed than yet seen, and in detached bunches—From 4 p. m. to midnight, pleasant—At 3.30, sounded for temperatures as per column—greatest transparency of water yet obtained, being very smooth over the cylinders and perfectly up and down.
8.	69.5				17° W.			
		69.	65.5	10, slightly rippled.		1028.8		
4.	69.3				17°30′W	100 fath.		
		69.	64.8	15, smooth.		1028.8		
8.	69.							FRIDAY, DECEMBER 7th, 1849.—Commenced search for "*Vankeulen's Vigia*"—Commences with squally appearances and rain—At 1 a. m.,
		69.	65.					

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h.	Direction.	Force.	Kinds.	Portion.	Motion from	Bar.
		° ′ ″	° ′ ″								
Dec. 13	8 A. M.	30 55	26 24	S. 35° E.	0.4	West.	Moderate.	Strat. and Cum's.	10	N'd. & W'd.	30.03
	4 P. M.	31 20	25 36	Eastward.	0.4	S. W.	Moderate.	Cir. Cum. Stra.	8	W. S. W.	30.15
" 14	Midn't.	31 35	24 40 30			S. S. W.	Moderate.	Stratus.	4	S. S. W.	30.13
	8 A. M.	31 35 30	24 14	N. 55° E.	0.3	S. W.	Moderate.	Cumulus.	7	S. W.	30.15
	4 P. M.	31 39 30	23 42 30	Eastward.	0.4	S. S. W.	Moderate.	Cir. Cum. Stra. & Nimbus.	8	S. W.	30.18
" 15	Midn't.	31 43	23 46			S. W. by W.	Very light breezes	Clear.	0		30.22
	8 A. M.	31 52 30	23 58 30	N. 32° W.	0.5	S. W.	Light airs.	Cum. Stratus.	2	S. W.	30.25
	4 P. M.	31 46 40	24 3	Westward.	1.4	S. S. W.	Light airs.	Cir. Cum. Stra.	2	Stationary.	30.23
" 16	Midn't.	31 45	23 57				Calm.	Stratus.	1	Stationary.	30.27
	8 A. M.	31 36 30	24 14	S. 86° W.	1.2	S'd. & E'd.	Lt. variable airs.	Cirro Stratus.	6	Eastward.	30.24
	4 P. M.	31 43	23 56 30	Westward.	0.4	E. S. E.	Light breezes.	Cir. Cum. Stratus & Nimbus	9	Eastward.	30.27
" 17	Midn't.	31 49	23 49			S. E.	Mod. & squally.	Cum. Stratus.	8	S. E.	30.20
	8 A. M.	31 47 40	23 45			S. E.	Moderate.	Cum. Stratus & Nimbus.	10	S. E.	30.14
	4 P. M.	31 47	23 8			S. by W.	Moderate.	Nimbus.	10	Southward.	30.10
" 18	Midn't.	32 00	22 18 40			S. by W.	Fresh.	Cum. Stratus.	7	Southward.	30.09
	8 A. M.	32 21 20	21 47	N. 16° E.	0.8	S. by E.	Fresh.	Cum Stratus & Nimbus.	8	Southward.	30.05

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude	CURRENT.		WIND.		CLOUDS.			Bar.
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h.	Direction.	Force.	Kinds.	Portion.	Motion from	
		° ′ ″	° ′ ″								
Dec. 18	4 P. M	32 27	21 6 40			E. S. E.	Fresh.	Cir. Cum. Strat.	8	Southward.	29.98
" 19	Midn't.	32 29 20	21 3			E. S. E.	Gale.	Cir. Cum. Strat. & Nimbus.	9	Southward.	29.99
	8 A. M.	32 30 30	21 3			S. by W.	Gale.	Cum. & Nimbus.	10	S. S. W.	29.97
	4 P. M.	32 36	20 58			S. S. W.	Gale.	Cum. Stratus & Nimbus.	10	S. & N.	29.96
" 20	Midn't.	32 41	20 50			S. S. W.	Fresh, with sq'lls.	Cum. Stratus.	7	S'd. & W'd.	29.97
	8 A. M.	32 41	20 6			W. S. W.	Fresh & squally.	Cum. Stratus & Nimbus.	8	W. S. W. & W. N. W.	30.00
	4 P. M.	32 1	19 39 40	South.	0.8	S. W. by W.	Fresh, with sq'lls.	Cum. Stratus.	7	W. S. W.	30.04
" 21	Midn't.	31 34	19 22			W. S. W.	Light breezes.	Cir. Cum. Strat.	6	W. S. W.	30.06
	8 A. M.	31 19	19 3 20	Eastward.	0.5	W. S. W.	Light airs.	Cum. Strat.	6	W. S. W.	30.03
	4 P. M.	30 55 30	18 42	Eastward.	0.8	W. by N.	Light breezes.	Cum. Strat.	7	Westward.	30.02
" 22	Midn't.	30 54 40	18 41 20				Calm.	Cir. Cum. Strat.	5	N'd. & E'd.	30.03
	8 A. M.	30 41 40	18 44 30	S. 43° W.	0.6	East.	Light airs.	Cumulus.	7	Eastward.	29.97
	4 P. M.	30 22 30	18 43 40	Westward.	0.3	S. E.	Light breezes.	Cum. Stratus.	9	S'd. & E'd.	30.01
" 23	Midn't.	20 22	18 25 40			S. E.	Moderate.	Cir. Cum. Strat.	7	S. E.	29.98
	8 A. M.	30 17 45	17 53	S. 35° E.	0.5	S. S. E.	Moderate.	Cir. Cum. Strat.	8	S'd. & E'd. N'd. & W'd. See remarks.	29.93
	4 P. M.	29 59	17 49			S. S. E.	Moderate.	Cir. Cum. Strat.	9	Cir. fr. N. W. Cum. fr. S. E. Stra. station'y	29.89
" 24	Midn't.	29 32	17 50			S. E.	Moderate.	Cir. Cum. Strat.	9	Cir. N. W. Cum. S. E. Stra. station'y	29.87

Lieut. Joseph C. Walsh, Commander.

THERMOMETER.				Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.	REMARKS.
Air.	Water.							
	Surface.	50 fath's.	100 fathoms.					
°	°	°						
69.	68.	68.	67° 200 fath's. 65° 500 fath's. 61°	3, much rippled.		1028.8 300fath's 1028.9 500fath's 1029.1	500	vatory, &c.—At 4, filled away—From 4 p. m. to 6 p. m. wind freshening, with stormy appearances—barometer falling, and heavy sea from Southward—At 5, hove to on starboard tack and prepared for a gale—6 p. m. to midnight, damp unpleasant weather, with frequent squalls and heavy sea—At 8, sounded with 100 fathoms, no bottom—At midnight, sounded with 120 fathoms, and no bottom—too much sea for temperatures.
66.	68.						120	**WEDNESDAY, DECEMBER 19th, 1849.**—Commences with stormy weather, hard squalls and lightning to the Southward—At 4 a. m. sounded with 120 fathoms, no bottom—a heavy head sea—meridian to 4 p. m. tempestuous weather—At 1, became suddenly very thick and dark, when wind suddenly flew round to N. N. W. in a very heavy squall, accompanied with heavy thunder, lightning, and rain in torrents—Barometer at time of shift of wind 29.93—At 4 p. m. variable light breezes, with squally appearances and heavy sea running—lightning to the Northward—At 5, wind veered again to the Southward—At 8 p. m. sounded with 120 fathoms, no bottom—8 to midnight, heavy squalls, attended with lightning to the Northward.
67.	68.							
68.	67.5							
		66.5	65.5					
65.	66.5							**THURSDAY, DECEMBER 20th, 1849.**—Commences with, and until 8 a. m., squally, with rain in heavy showers—lightning to the Southward and Westward, and to the Southward and Eastward, irregular cross sea—At daylight made more sail and filled away—From 8 a. m. to 4 p. m. pleasant—At 1, sounded with 100 fathoms; temperatures as per column—At 2, a squall from S. W. with rain—4 p. m. to midnight, pleasant, with a Westerly swell—At 8.30, sounded with 100 fathoms—temperatures as per column.
64.	67.							
		67.5	63.5					
68.	67.			5, much rippled.	22°40'W			
		67.5	65.					**FRIDAY, DECEMBER 21st, 1849.**—Commences, and until 8, a. m., pleasant—At 6, sounded for temperatures as per column—8 a. m. to 4 p. m. pleasant, with occasional showers of light rain—Saw many shoals of porpoises, rudder fish and gar fish, and much *whale feed*—At 1.45 p. m. saw a large shoal of *sperm whales*, over 100, moving in a N. E. direction—Porpoises going the same direction—From 4 to midnight, calm and pleasant—At 7 p. m. sounded for temperatures as per column.
66.	68.							
		67.5	66.					
65.	68.				21°20'W			
72.	68.							**SATURDAY, DECEMBER 22d, 1849.**—Commences with, and until 8 a. m., pleasant, with squally appearances—At 6, saw a flock of *gulls*—8 a. m. to 4 p. m. pleasant, with a long N. W. swell—At 3, sounded for temperatures as per column—From 4 p. m. to midnight, pleasant, with a slight N. W. swell—A "halo" round the Moon—At 11.40, sounded for temperatures as per column.
		68.	65.					
65.	68.5							
66.	68.				18°30'W			**SUNDAY, DECEMBER 23, 1849.**—Commences with, and until 8 a. m., pleasant weather—A long regular swell from N. W.—Clouds were moving in opposite directions—the upper strata "*Cirri*" from N. W., and lower strata "*Cumuli*" from E. S. E., "*Strati*" stationary about the horizon—Shoal of porpoises playing about us—From 8 a. m. to 4 p. m., pleasant—At 9.40, sounded as per column—Saw a fish-hawk and a flock of sea-gulls—From 4 p. m. to midnight, pleasant—At 4.30, made the Island of Palma, (Canaries,) bearing per compass S. S. W., distant 67 miles—At 4.40, sounded for temperatures as per column—Clouds observed to move in opposite directions as per column—At 5.30, center of Palma bore per compass S. 20° W.—A long swell from N. W., and a short head sea from the Eastward—At midnight, Island of Palma in sight—Observed an unusual bright and strongly defined "halo" around the Moon—At 11.30, sounded for temperatures as per column—Lightning to the Westward.
						Surface. 1028.4 100fath's 1028.7		
70.	68.5	68.5	63.5	6, much rippled.				
65.	68.5	66.5	63.5					
65.	68.5	67.5	65.		19°32'W			**MONDAY, DECEMBER 24th, 1849.**—Commences with, and until 8 a. m., pleasant—first part, squally appearances to N. E. and lightning from W. to N.—A long regular swell from N. W., and a short head sea (from Eastward)—At daylight, made the Island of Teneriffe, bearing per compass S. W. by S. ½ S.—At 6.30, made the Island of "*Gomera*," bearing per compass S. ½ E.—From 8 a. m. to 4 p. m., pleasant—At 9, East end of Island of Palma bore per compass S. 20° W., West point S. 43° W.—At 11, sounded for temperatures—In hauling up, the line parted, and the two large metal cylinders, 2 wooden cylinders, and one Erickson's patent lead, were lost. (N. B. This is a serious misfortune, and I fear an irreparable one, especially the metal
68.	68.2	68.	65.	5, much rippled.				
66.	68.	68.	65.					

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h'r.	Direction.	Force.	Kinds.	Portion.	Motion from	Bar.
		° ′ ″	° ′ ″								
Dec. 24	8 A. M.	29 16 30	17 47 50	S. 45° W.	0.75	S. S. E.	Light breezes.	Cirro Stratus.	8	N'd. & E'd.	29.83
	4 P. M.	29 9	17 37 10	S. 16° W.	0.4	S. E. by S.	Light breezes.	Cir. Cum. Strat.	7	S. E.	29.87
" 25	Midn't.	29 9	17 22 30			S. E. by E.	Light breezes.	Cum. Stratus.	5	E. S. E.	29.85
	8 A. M.	29 13 45	17 11 10	N. 33° W.	0.3	E. S. E.	Gale.	Cumulus.	8	Eastward.	29.87
	4 P. M.	28 47 30	17 10			East.	Fresh.	Cir. Cum. Strat.	10	Eastward.	29.92
" 26	Midn't.	29 6	16 57 25			E. S. E.	Gale.	Cum. & Nimbus.	10	N'd. & E'd.	29.97
	8 A. M.	29 17	17 5	N. 57° W.	0.3	E. S. E.	Gale.	Nim.&Cum.Strat.	10	S'd. & E'd.	29.95
	4 P. M.	29 1	17 10 50			E. by S.	Gale.	Cum. Stratus.	10	E. S. E.	30.02
" 27	Midn't.	29 12 30	17 16 30			East.	Gale.	Cir. Cum. Strat.	9	Cir. N. W. Cum. E. S. E.	30.07
	8 A. M.	28 50	16 47 30	S. 84° E.	1.4	E. by S.	Fresh with squalls.	Cir. Cum. Strat.	8	Cir. N. W. Cm.St.E.S.E.	30.10
	4 P. M.	28 49 30	16 28 40	Eastward.	1.4	E. by S.	Gale.	Cir. Cum. Strat.	7	Eastward.	30.12
" 28	Midn't.	29 7	16 33			E. by S.	Fresh with squalls.	Cum. Stratus.	8	S'd. & E'd. and N. W.	30.10
	8 A. M	29 1	16 15	N. 69° E.	1.0	S. E. by E.	Mod. with squalls.	Cir. Cum. Strat.	8	Eastward.	30.12
	4 P. M.	28 51	16 3	N. 33° E.	1.5	S. E. by E.	Mod. with squalls.	Cir. Cum. Strat.	9	Eastward.	30.08
" 29	Midn't.	At anchor off the town of Santa Cruz, "Teneriffe."				S. E.	Moderate.	Cir. Cum. Strat.	6	S'd. & E'd. and W'd.	30.01
	8 A. M.										
	4 P. M.										
1850. Jan. 6	Midn't.	At Anchor, Roadstead of Santa Cruz.									
	8 A. M.										
	4 P. M.										
" 7	Midn't.	Got underway.									
	4 A. M.					N. E.	Moderate.				
	8 A. M.	N. 28°17′ by bearing & angles.	W. 16°10′ by bearing & angles.			N. E.	Moderate.	Cumulus.	7	N. E.	30.22
	4 P. M.	27 22	16 38 30	West.	0.5	N. E. by E.	Fresh.	Cum Stratus.	6	N E.	30.24
" 8	Midn't.	26 38 30	17 4 30			N. E.	Moderate.	Cum. Stratus.	5	N. & E.	30.23
	8 A. M.	25 44	17 26 50	S. 10° E.	0.7	E. N. E.	Moderate.	Cumulus.	8	N. E.	30.19
	4 P. M.	24 59	18 00 30	S. 60 W.	1.0	E. N. E.	Moderate.	Cir. Cum. Strat.	7	N. E.	30.15

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h.	Direction.	Force.	Kinds.	Portion.	Motion from	Bar.
		° ′ ″	° ′ ″								
Feb. 28	4 P. M.	14 41	23 53			E. N. E.	Fresh.	Hazy.	0		29.90
March 1	Midn't.	14 22 00	25 11 00			N. N. E.	Moderate.	Cirro Stratus.	4	Stationary.	29.93
	8 A. M.	14 10	25 11	S. 40° E.	0.8	N. N. E.	Moderate.	Cirro Stratus.	6	N'd & E'd.	29.92
	4 P. M.	14 19	26 14 40	Westerly.	0.4	N. E. by N.	Moderate.	Cirrus & Hazy.	5	Stationary.	29.90
" 2	Midn't.	14 25 20	27 14 40			N. E. by N.	Moderate.	Thick haze & Mist.			29.92
	8 A. M.	14 36	28 29 35	S. 65° W.	0.7	N. N. E.	Moderate.	Hazy.	0	Stationary.	29.95
	4 P. M.	14 49	29 42 20	Westerly.	0.5	N. E.	Fresh.	Cir. Stratus.	8	N'd & E'd.	29.96
" 3	Midn't.	15 4 20	30 52 35			N. E.	Fresh.	Cum. Stratus.	6	N'd & E'd.	29.98
	8 A. M.	15 16 20	32 16 30	S. 79° W.	0.7	N. E. by E.	Fresh.	Cir. Cum. & Strat.	7	N. E.	29.98
	4 P. M.	15 30 40	32 21			E. N. E.	Moderate.	Cum. Stratus.	8	N. E.	30.00
" 4	Midn't.	15 41	34 22			E. N. E.	Moderate.	Cir. Cum. & Strat.	5	Cirrus from the W'd Cum. from Northeast.	30.03
	8 A. M.	15 46 40	35 30 20	S. 62° W.	0.7	East.	Moderate.	Cir. Cum. Strat.	7	N'd & E'd.	30.01
	4 P. M.	15 55 20	36 23 30	Westerly.	0.3	E. N. E.	Moderate.	Cum. Strat.	5	E. N E.	30.00
" 5	Midn't.	16 4 20	37 17			E. by N.	Moderate.	Cir. Cum. Strat.	8	E. N. E.	30.00
	8 A. M.	16 6 30	37 59	South.	0.2	E. S. E.	Light breeze.	Cir. Cum. & Nimb.	9	N'd & E'd.	29.99
	4 P. M.	16 12 30	38 34			S. S. W.	Light breeze.	Cir. Cum. & Strat. & Nimbus.	8	Irregular & variable.	29.96
" 6	Midn't.	16 19	39 8 40			S. E.	Light breeze.	Cum. Strat. & Nimbus.	8	Irregular & variable.	29.99
	8 A. M.	16 26	39 42 40	00	0.0	Variable from E. to S. S. W.	Light breeze.	Cum. Strat.	9	Variable & irregular.	30.00
	4 P. M.	16 35 20	40 21	00	0.0	Variable from S. S. W. to S. E.	Light breeze.	Cir. Cum. Strat.	5	Southward.	29.94
" 7	Midn't.	16 42 30	40 55			S. S. W.	Light breeze.	Cum. Stratus.	3	Southward.	29.97
	8 A. M.	16 56 30	41 37	N. 51° W.	0.4	S. W.	Light breezes.	Cum. & Stratus.	6	Southward.	29.98
	4 P. M.	17 2 20	42 2 30			W. S. W.	Very light breeze.	Cum. Stratus.	2	Stationary.	29.97

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h.	Direction.	Force.	Kinds.	Portion.	Motion from	Bar.
		° ′ ″	° ′ ″								
March 8	Midn't.	17 3 25	42 9			Var. fm S.W. to N. E. and squally.	Very light airs.	Cum. Stra.&Nim.	6	Irregular.	30.02
	8 A. M.	17 1 45	42 41	S. 78° W.	1.0	Varying from S. to S. E.	Light airs.	Cum. and Nimb.	9	N'd&S'd&W	30.03
	4 P. M.	17 6 45	43 39	W.	0.9	N. by E.	Moderate.	Cir. Cum. & Strat.	5	N.N.E. Stra. statio'y.	30.05
" 9	Midn't.	17 12 20	44 21 20			N. by E.	Moderate.	Cumulus.	3	N'd & E'd.	30.09
	8 A. M.	17 13 20	45 16	N. 70° W.	0.6	N. by E.	Moderate.	Cum. & Strat.	5	Northward.	30.07
	4 P. M.	17 19	46 11 45	Westerly.	0.4	N. by E.	Moderate.	Cir. Cumulus.	7	N. N. E.	30.05
" 10	Midn't.	17 22	46 51 30			N. E.	Light breeze.	Cir. Cumulus.	8	N. E.	30.09
	8 A. M.	17 21	47 35 30	Southerly.	0.2	N. E. by N.	Light breeze.	Cumulus.	8	N'd & E'd.	30.06
	4 P. M.	17 23 30	48 24 40	Westerly.	0.4	N. E. by E.	Moderate.	Cir. Cum.	7	N. E.	30.05
" 11	Midn't.	17 24 30	49 17			N. E.	Moderate.	Cir. Cum.	7	N. E.	30.05
	8 A. M.	17 16 30	50 18	South.	0.7	N. E.	Moderate.	Cir. Cum. Stratus & Nimbus.	6	N. E.	30.04
	4 P. M.	17 15 40	51 22 40			E. N. E.	Moderate.	Cir. Cum.	7	N'd & E'd.	30.06
" 12	Midn't.	17 19 30	52 17			E. N. E.	Moderate.	Cumulus.	3	E. N. E.	30.07
	8 A. M.	17 18 15	53 24	S. 61° W.	0.5	E. N. E.	Moderate.	Cumulus.	4	N. E.	30.05
	4 P. M.	17 18 45	54 12 45			E. by N.	Moderate.	Cumulus.	4	E. N. E.	30.08
" 13	Midn't.	17 17	55 6			East.	Moderate.	Cumulus.	5	E. N. E.	30.03
	8 A. M.	17 11 40	56 4	S. 62° W.	0.4	Varying from E. N. E. to E. S. E.	Moderate, with squalls.	Cum. Stratus, & Nimbus.	8	E. N. E.	30.08
	4 P. M.	17 12	57 9			E. N. E.	Moderate.	Cir. Cum.	8	E. N. E.	30.05
" 14	Midn't.	17 18 00	58 16 00			N. E.	Fresh with squalls.	Cum. Stratus and Nimbus.	9	E. N. E.	30.12
	8 A. M.	17 13 20	59 26 20	S. 57° W.	0.3	E. N. E.	Fresh.	Cir. Cum.	6	E. N. E.	30.09
	4 P. M.	16 53 40	60 27 20			E. by N.	Moderate.	Cirro Cum.	8	Eastward.	30.0[illegible]

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per. h.	Direction.	Force.	Winds.	Portion.	Motion from	Bar.
		° ″	° ′ ″								
March 15	Midn't.	16 50 15	61 24 20			E. by N. to N. E.	Mod. & squally.	Cum. & Nimbus.	6	Eastward.	30.07
	8 A. M.	16 47 00	61 54 30	West.	1.0	E. by N.	Mod. with squalls	Cum. & Nimbus.	8	N'd & E'd.	30.03
	4 P. M.	16 52 30	63 0 00			E. N. E.	Fresh with squalls	Cum. & Strat.	9	N. E.	30.05
" 16	Midn't.	17 27 00	63 52 00			N. E.	Mod. with squalls.	Cum. & Nimbus.	6	N. E.	30.06
	8 A. M.	17 43 30	64 23 20			E. N. E.	Moderate.	Cumulus.	3	N. E.	30.07
		At 2 P. M. Anchored in the Harbor of St. Thomas.									
" 14	4 P. M.										
May 6	Midn't.										
	8 A. M.										
	4 P. M.	18 23	65 9	Point of departure.							
" 7	Midn't.	18 54	65 17			N. E. by E.	Moderate, with a squall at 9.50 p. m.	Cum. Stra. & Nim.	6	N. E.	30.02
	8 A. M.	19 16 20	65 47	N. 80° W.	0.9	N. E.	Light, with squalls	Cirro Cumulo, Stratus & Nimbus.	7	N. E.	30.00
	4 P. M.	19 56	66 18 20	Westerly.	0.4	N. E.	Moderate.	Cirrus.	2	N'd. & E'd.	29.99
" 8	Midn't.	20 29	66 22			N. E.	Light breeze.	Cir. Cum. Strat.	3	N'd. & E'd.	30.02
	8 A. M.	20 55	66 32 30	N. 64° W.	0.7	E. N. E.	Light breeze.	Cumulus.	2	N'd. & E'd.	30.00
	4 P. M.	21 4	66 32 30	Westerly.	0.4	E. N. E.	Very light airs.	Cum. & Stratus.	4	N'd. & E'd.	30.01
" 9	Midn't.	21 30	66 44			N. E. by N.	Light breeze.	Cum. & Cumulo Stratus.	2	N'd. & E'd.	29.99
	8 A. M.	22 3	67 1	N. 45° W.	1.0	N. E. by N.	Light breeze.	Cumulus.	4	N. E.	30.00
	4 P. M.	22 14	67 1 30	Westerly.	1.5	N. E. by E.	Very light breeze.	Cum. Stra. & Cir.	2	Stationary.	30.00
" 10	Midn't.	22 32	66 54			E. by S.	Very light breeze.	Cum. & Cumulo Stratus.	3	Cum. N. E. Stra. stat'y.	30.01
	8 A. M.	23 7	66 53	N. 69° W.	0.8	E. by N.	Light breeze.	Cum. & Stratus.	6	N'd & E'd.	30.03
	4 P. M.	23 44	66 16	Easterly.	0.5	E. S. E.	Moderate.	Cum. & Cumulo Stratus.	9	N. E.	30.02
" 11	Midn't.	23 53	66 6			S'd. & E'd.	Lt. variable airs.	Cir. Cum'o. Stra. & Nimbus.	6	N. E.	30.05
	8 A. M.	24 22	65 39	N. 38° E.	0.8	E. S. E.	Light breeze.	Cirrus & Cumulus.	3	N'd. & E'd.	30.06
	4 P. M.	24 43 30	65 25 30	Westerly.	0.3	E. S. E.	Light breeze.	Cumulus.	3	Eastward.	30.07
" 12	Midn't.	24 59 30	65 18 30			East.	Light breeze.	Cumulus.	2	Eastward.	30.07
	8 A. M.	25 38 40	64 58	N. 37° W.	0.9	E. S. E.	Moderate.	Cum. Stratus.	2	Eastward	30.05

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h.	Direction.	Force.	Kinds.	Portion.	Motion from	Bar.
		° ′ ″	° ′ ″								
May 12	4 P. M.	25 55	64 43	Westerly.	0.3	S. E. by E.	Light breeze.	Cirrus & Stratus.	5	Eastward.	30.06
" 13	Midn't.	25 58 30	64 39				Light var. airs.	Stratus.	1	Stationary.	30.05
	8 A. M.	26 26	64 25 30	N. 14° E.	1.3	S. E.	Light airs.	Cirro Cumulus & Stratus.	3	Eastward.	30.01
	4 P. M.	26 42	64 4	Easterly.	0.4	S. S. E.	Light breezes.	Cumulus and Cumulo Stratus.	6	S'd & E'd.	30.02
" 14	Midn't.	26 47	63 57			N. W.	Var. light winds.	Cum. & Stratus.	5	S.W.& N.W.	30.03
	8 A. M.	26 46	63 53		0.0	N. N. W.	Var. light winds.	Cumulus.	2	N'd & W'd.	30.04
	4 P. M.	26 46	63 49			Northward.	Light airs.	Cirrus & Cumulus. & Cum. Stratus.	8	Northward.	30.08
" 15	Midn't.	27 15 30	63 54			E. N. E.	Fresh with squ'ls.	Cum. & Nimbus.	9	Eastward.	30.10
	8 A. M.	27 57	64 7	N. 39° W.	0.7	East.	Fresh breeze.	Cumulus.	6	Eastward.	30.15
	4 P. M.	28 18	63 57	Westerly.	0.4	E. S. E.	Moderate.	Cirrus & Cumulus	7	Eastward.	30.08
" 16	Midn't.	28 31	64 33			S. E.	Light breeze.	Cirro Cumulus.	8	N'd & W'd & S'd & E'd.	30.07
	8 A. M.	28 54	65 33	N. 60° W.	0.4	S. by E.	Moderate.	Cirro Stratus.	8	Southwest.	30.00
	4 P. M.	29 15 30	66 33			S. by W.	Moderate.	Cirrus & Stratus.	6	Southward.	29.96
" 17	Midn't.	29 36 30	67 31			S. W.	Fresh breezes & Squalls.	Cumulo, Stratus & Nimbus.	9	S'd & W'd.	29.90
	8 A. M.	29 48	67 54	East.	0.1	S. W.	Fresh.	Nimbus & Cum.	10	S'd & W'd.	29.90
	4 P. M.	30 8	67 58	Easterly.	0.4	W. N. W.	Light breeze.	Cumulo Stratus.	3	Stationary.	29.88
" 18	Midn't.	30 12	67 56			N. N. W. & Northward.	Light var. airs. & Calms.	Clear.	0		29.88
	8 A. M.	30 6	67 56	South.	0.3		Calm.	Clear.	0		29.90
	4 P. M.	30 7	68 11		0.0	S. W. by S.	Light breeze.	Clear.	0		29.90
" 19	Midn't	30 13	68 44			S. S. W.	Light breeze.	Cumulus.	1	Stationary.	29.91
	8 A. M.	30 21 30	69 17	N. 60° W.	0.4	S. W.	Light breeze.	Cirrus & Stratus.	2	Stationary.	29.92

eut. Joseph C. Walsh, Commander.

THERMOMETER.				Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.	REMARKS.
	Water.							
ir.	Surface.	50 fath's	100 fathoms.					
°	°	°	°					
.	75.	76.	69.	10, slightly rippled.		480fath's		From 8 a. m. to 4 p. m., pleasant—At 9, lowered a boat and tried currents—found a slight surface drift setting to the Westward, and a strong *under current* of 1¼ knots per hour setting N. by E.—At 9.30, got up and shipped the wire cylinder in its frame—furled all sails, and at 10.30, commenced reeling off—At 11.15, shipped the reel, having 1050 fathoms wire up and down, without striking bottom—(a considerable swell getting up, was afraid to trust more)—At 11.18, commenced reeling up—At 1.50, finished reeling up, having been 2h. 30m. in doing so; the wire was carefully dried and oiled in reeling up—The Syx's thermometer came up from the depth of 1000 fathoms, unbroken, and indicating 49° temperature as per column—At 4, heavy sea running from the N. E., and weather looking ugly—From 4 p. m. to midnight, unpleasant squally weather, with rain and very heavy sea.
						1028.4	480	
5.	75.5							
5.	75.				1° 32′ E.			
2.	77.5	75.	74.	10 f., ripl'd.				
							500	
		76.5	74.5					
			500 fath's.					
			53°	15, smooth.		1028.5		WEDNESDAY, MAY 15th, 1850.—Midnight to 8 a. m., pleasant weather, with a heavy head sea (from N. E.,)—8 a. m. to 4 p. m., heavy head sea—Passed much sea-weed ranged in parallel lines E. and W.—At 2.30, sounded with 540 fathoms line, no bottom—took temperatures as per column—too much sea for correct temperatures. (*Note.—In fact they can only be relied upon as quite correct in smooth times, when the vessel is steady.* The lifting and plunging in rough sea, opens the valves of the cylinders, so that they come up with surface water. The difficulty with the self-registering Syx's thermometer, is that the markers are jarred out of place, work downwards, and thus indicate falsely; the pointers or markers often come up entirely immersed in the Mercury. I am satisfied, that those supplied us are of inferior quality—Passed sea-weed ranged in parallel lines as usual, in a breeze, and of quite green and fresh appearance—4 p. m. to midnight, pleasant—a heavy sea running from N. E.
7.	76.5							
6.	75.5				0° 40′ W.			
			1000 fath's.				1050	
2.	77.		49°					
.	75.2							
.	74.							
	73.	74.	73.			1028.7		THURSDAY, MAY 16th, 1850.—Midnight to 8 a. m., pleasant—At 5.20, sounded for temperatures as per column—Much sea-weed and a shoal of porpoises—8 a. m. to 4 p. m., pleasant—9.30, sounded for temperatures as per column—but little sea-weed—At 1.45, sounded for temperatures as per column—Many flying fish, and stormy petrels—Much sea-weed ranged in parallel lines with the wind—4 p. m. to midnight, unpleasant weather, with occasional rain—At 7, sounded for temperatures as per column—A heavy sea during the day from the S'd. and W'd:
			500 fath's.			500 fath's		
			62°			1028.6		
	72.5							
	71.	70.5	67.					
	71.				2° W.			
	71.	67.5	66.5			1028.5		
	73.	72.	68.					FRIDAY, MAY 17th, 1850.—Midnight to 8 a. m., squally, with heavy rain, and a heavy irregular sea—8 a. m. to 4 p. m., pleasant, with an irregular heavy swell—At 11, sounded for temperatures as per column—Much sea-weed, stormy petrels, many *Portuguese men-of-war*, and a small *land bird* flew on board of us—4 p. m. to midnight, pleasant weather, with a heavy irregular swell—6.50, sounded for temperatures as per column.
	72.							
	74.	74	67.					
	74.							
.	69.5				1° 7′ W.			SATURDAY, MAY 18th, 1850.—Midnight to 8 a. m., clear pleasant weather, with a heavy swell—8 a. m. to 4 p. m., pleasant—At 9, lowered a boat to try the currents, found a surface current of ½ knot per hour, setting N. W. by W., and a slight under current setting N. E.—At 9.30, sounded for temperatures as per column—But very little sea-weed seen—At 1, the swell having moderated, commenced preparations for sounding with the wire—At 2.55, commenced reeling off—At 3.55, had got down 2050 fathoms wire, without any evidence of reaching bottom, and on then stopping the reel for the purpose of reeling up (fearing to trust more to the swell, although it was but slight,) the wire parted at one of the joints near to the surface of the water—Lost 2050 fathoms of wire, a self-registering thermometer, a 12 lb. lead and Stellwagen cup—This break was caused as before, by the lifting of the stern in the slight swell of the sea—4 p. m. to midnight, pleasant weather—11.50 sounded for temperatures as per column.
	70.	69.3	65.					
.	71.					1028.4		
		68.	64.5					
.	69.5							
3.	69.							
	70.	69.5	65.	15, slightly rippled.				
						1028.3		
4.	70.5				0° 8′ W.		3050	
72.	71.	67.5	65.					
						1028.2		SUNDAY, MAY 19th, 1850.—Midnight to 8 a. m., pleasant—Quantities of gulf-weed in lines parallel with the wind, as usual—A swell setting from the S. W.—8 a. m. to 4 p. m., pleasant—11, sounded for temperatures as per column—4 p. m. to midnight, pleasant—Observed
71.	70.5					100fath's		
	71.	69.	64.5	12, rippled.				
						1028.1		

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h'r.	Direction.	Force.	Kinds.	Portion.	Motion from	Bar.
		° ′ ″	° ′ ″								
May 19	4 P. M.	30 29	69 32		0.0	W. S. W.	V. Light wind.	Cirrus, Cumulo & Status.	5	S. W.	29.91
" 20	Midn't.	30 34	70 3			S. W. by S. var. & squally	Moderate.	Cum. & Nimbus.	4	N'd & W'd.	29.92
	8 A. M.	30 35 30	70 2 30	N. 39° W.	0.5		Calm.	Cum. & Nimbus.	8	S'd. & W'd. & irregular.	29.95
	4 P. M.	30 40	70 42	Westerly.	0.7	N. N. E.	Light breezes.	Cir. Cum. Stratus.	7	S'd & W'd. & N. & E.	29.99
" 21	Midn't.	30 47	71 24			N. N. E.	Moderate.	Cumulus.	4	N. E. & S'd & E'd.	30.00
	8 A. M.	30 46	72 6	South.	0.5	E. by N.	Moderate.	Cumulus.	6	Eastward.	30.04
	4 P. M.	30 54	72 46	Easterly.	0.4	East.	Moderate.	Cirro Cumulus.	7	Eastward.	30.08
" 22	Midn't.	31 25	72 50			E. by N.	Light breeze.	Cirro Cum. Strat.	6	Cir. Cum from N. E. & Cum Strat. stationary.	30.11
	8 A. M.	31 53	73 3	S. 79° W.	0.5	E. N. E.	Light breeze.	Cum & Cum Stra.	5	N'd & E'd.	30.09
	4 P. M.	32 6	73 19	Westerly.	0.8	N. E.	Light breeze.	Cir. Cum Stratus.	7	N'd & E'd.	30.17
" 23	Midn't.	32 35	73 24 30			N. E. by E.	Light breeze.	Cum. Stratus.	1	Stationary.	30.16
	8 A. M.	32 58	73 36	N. 48° W.	0.9	N. E. by E.	Light breeze.	Cum. Stratus.	2	N'd & E'd.	30.12
	3 P. M.										
	4 P. M.	33 3	73 52	Westerly.	1.5	Calm.	Calm.	Cumulus.	3	N'd & E'd.	30.13
	8 P. M.										
" 24	Midn't.	33 23	73 28			N. W.	Light breeze.	Cirrus & Cumulus	4	N. W.	30.10
	4 A. M.										
	8 A. M.	33 36	73 2	N. 37° E.	0.4	N. N. E.	Moderate with fresh squalls.	Cum & Nimbus.	9	Northward.	30.07
	12 Noon.	33 32 30	72 52								
	4 P. M.	33 27	72 45			N. N. E.	Moderate with fresh squalls.	Cum & Nimbus.	10	N'd & E'd	30.06
	6 P. M.										
	7 P. M.										

eut. Joseph C. Walsh, Commander.

THERMOMETER.				Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.
	Water.						
ir.	Surface.	50 fath's	100 fathoms.				
°	°	°	°				
,	71.5						
	71.5	71.	66.				
1.	71.4						
1.	70.				2° 40′ E.		
5.	71.	69.	67.	8, smooth.			
3.	71.						
3.	71.5	71.	65.			1028.4	
						100fath's	
						1028.3	
3.	71.5						
2.	72.	70.5	69.	8, rippled.			
0.	72.						
4.	73.5	71.5	68.			1028.2 100fath's	
5.	73.2						
2.	74.	69.	68.5			1028.3	
2.	73.						
9.	71.5	70.5	66.5	10, rippled.	0° 5′ E.	1028.4	
						100fath's	
						1028.4	
9.	71.						
			500 fath's.			500fath's	
5.	72.						
			57°	10, rippled.		1028.3	
6.	72.						500
1.	71.5	71.5	67.				1900
9.	73.				1° E.	1028.3	
6.	75.	73.5	70.			100fath's	
7.	79.					1028.3	
7.	76.						
2.	76.5						
73.	76.	73.	72.				
70.	76.						
71.	77.						200
72.	76.5						
73.	76.7						
70.5	75.5						
69.	72.						

REMARKS.

lightning to the N'd. and W'd—At 8, sounded for temperatures as per column—Ends with squally appearances.

Monday, May 20th, 1850.—Commences with, and until 4 a. m., squally appearances—Lightning in all quarters of the horizon, with thunder—A heavy thunder and lightning storm with very heavy rain from 3 to 4—Wind veering all around the compass—From 4 to 8 a. m. calm with heavy irregular swell—Much sea-weed about the schooner—From 8 a. m. to 4 p. m. pleasant weather—At 10.40 lowered a boat to try surface and under currents; found a surface current of ¾ knot per hour setting W. by N. and an under current, at 126 fathoms, of 1 knot per hour setting to the eastward—Sounded for temperature as per column—Passed quantities of sea-weed—From 4 p. m. to midnight pleasant—Saw some gulls and stormy petrels—At 7 sounded for temperatures as per column—Ends with lightning and squally appearances to the southward and westward.

Tuesday, May 21st, 1850.—Midnight to 4 a. m. pleasant weather with squally appearances and a heavy swell—At 6 sounded for temperatures as per column—Syx's thermometer came up with the markers immersed in the mercury—8 a. m. to 4 p. m. pleasant—At 1.40 sounded for temperatures as per column; the minimum marker of the Syx's thermometer was found to have penetrated the mercury—Saw but little sea-weed—4 p. m. to midnight pleasant—At 8 sounded for temperatures as per column—Saw a flock of oceanic birds.

Wednesday, May 22d, 1850.—Commences and until 4 a. m. pleasant; lightning to the northward and westward—4 a. m. to 8 a. m. pleasant—At 5 sounded for temperatures as per column—Swell setting from northward and eastward—Saw stormy petrels and other oceanic birds; very little gulf-weed—From 8 a. m. to 4 p. m. clear pleasant weather with a smooth sea—At 9 lowered a boat to try currents, found a surface current of ¼ knot setting to the southward and an under current (at 126 fathoms) of ½ knot setting to E. by N.—Sounded with 500 fathoms line; no bottom; temperature as per column—At 1 p. m. got up the wire reel and made preparations for sounding—the sea being remarkably smooth and every appearance of a continuance of fine weather—At 2 commenced reeling off—At 3.45 having put down 1900 fathoms without reaching bottom, the wire parted at the reel owing to one of the links of the wire catching upon another on the reel, it broke at the short nip of the link, this was the largest sized wire—Lost 1900 fathoms wire, one 8 lbs. lead and one Syx's self-registering thermometer—At the time the wire parted we were reeling off very slowly and carefully, and used likewise the precaution of a stopper at the fair leader over the stern; but the wire worked through the stopper—From 4 p. m. to midnight pleasant weather—Saw oceanic birds and a hump-back whale, and a shoal of black-fish. ☞ *Note,* This leaves but 800 fathoms wire on the reel, and the Syx's self-registering thermometer lost, was the only one left worth anything—I intended to trust to the depth of 1500 fathoms, as I had succeeded with it to the depth of 1000 fathoms on a prior occasion.

Thursday, May 23d, 1850.—Midnight to 4 a. m. pleasant—At midnight sounded for temperature as per column—A long regular swell from N. E.—8 a. m. to 4 p. m. pleasant—At 9 lowered a boat to try current, and sounded for temperature, as per column—found a surface current of 1 knot setting to W. N. W., and an under current (at 126 fathoms) of 1 knot setting to eastward—Saw two fin back whales, and many stormy petrels in our wake, as usual—Passed large quantities of whale-feed—4 p. m. to midnight, pleasant—11.40 sounded for temperature, as per column—Passed large quantities of "Brit." ☞ *Note.* An extraordinary rise in the temperature of the surface water appearing during this day—from 71° to 79°, as per column—must likely be an off-shot from the gulf stream.

Friday, May 24th, 1850.—Midnight to 8 a. m. unpleasant, squally weather, with occasional rain and a long heavy swell from the N'd and W'd—8 a. m. to 4 p. m. unpleasant, thick squally weather with a heavy head sea and occasional rain—At meridian commenced the search for *Ashton Rock*—4 p. m. to midnight thick squally weather

Abstract Log—U. S. Schooner Taney,

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h'r.	Direction.	Force.	Kinds.	Portion.	Motion from	Bar.
		° ′ ″	° ′ ″								
May 24	8 P.M.										
	10 P.M.	33 24 30	72 41								
	11 P.M.										
" 25	Midn't.	33 28 30	72 41			E. by N.	Moderate with fresh squalls.	Cumulus.	9	N'd & E'd & irregular.	30.06
	8 A.M.	34 1	72 35			E. by S.	Fresh with squalls.	Cirro Cumulus & Nimbus.	9	Eastward.	30.03
	11 A.M.										
	12 Noon.	34 14	72 29								
	1 P.M.										
	4 P.M.	34 2	72 25	Easterly.	0.7	S. E.	Fresh with squalls.	Cum. & Nimbus.	10	Eastward.	30.01
	6 P.M.										
" 26	Midn't.	33 46	72 27	Southerly.	0.8	E. S. E.	Moderate.	Cum. & Nimbus.	10	S'd & E'd.	30.02
	2 A.M.										
	6 A.M.										
	7 A.M.										
	8 A.M.	34 46	72 11 45	S. 50° E.	0.6	S. E.	Fresh.	Cirro Cumulus.	7	S'd & E'd.	30.00
	9 A.M.										
	10 A.M.										
	Noon.	33 46 30	72 6 30								
	4 P.M.	33 53	71 49	Easterly.	0.2	S. E.	Fresh.	Cir. Cum. & Nim.	10	S'd & E'd.	29.96
" 27	Midn't.	33 58	71 38			S. E.	Fresh, with sq'lls.	Cum. & Nim.	10	S'd & E'd.	29.96
	8 A.M.	34 4	71 26			S'd & var.	Mod. with squalls.	Cum. & Nim.	9	S'd & E'd.	29.90
	9 A.M.										
	Noon.	34 3	71 12								
	3 P.M.	33 49	71 11								
	4 P.M.	33 49	71 17			N. by E.	Moderate.	Cir. Cum. & Stra.	3	N. & E. & stationary.	29.88
	8 P.M.	33 46	71 42								
" 28	Midn't.	33 44	71 47			N. W.	Moderate.	Cum. & Strat.	2	N'd & W'd & stationary.	29.89
	2 A.M.	33 40	71 56								
	4 A.M.	33 44	71 51								

ieut. Joseph C. Walsh, Commander.

THERMOMETER.				Transparency in fathoms.	Variation observed.	Specific gravity of sea water corrected to 60° temperature.	Deep sea soundings, in fathoms.	REMARKS.
ir.	Water.							
	Surface.	50 fath's	100 fathoms.					
°	°	°	°					
8.	75.							with a very heavy head sea—At 8 sounded with 200 fathoms line; no bottom; too much sea for taking temperature at depths. ☞ *Note*—The sudden fall of 3½ degrees (75.5° to 72°) in the surface temperature from 6 to 7 p. m. was not, by some oversight, reported to me till 8 p. m.—We had then got into 75°, as per column—I wore ship and stood back to find and sound in this place of remarkable temperature—on going back, the temperature was tried every 10 minutes, and it was found to lower very gradually, and by 10 p. m. it had fallen to 72°; the same as passed over at 7—Here we hove to and sounded with 300 fathoms line and found no bottom—Before filling away the temperature was again tried and found to remain at 72°—Standing on a course N. by E. from this, it was found to increase gradually, and at midnight it again stood at 74°—There was too much sea for getting the temperature at depths—the cylinder came up empty or with surface water—that noted in the column for 100 fathoms cannot be depended upon, as most likely surface water was mixed with it.
9.	72.							
9.	72.		70.				300	
9.	74.							
9.	76.5							
9.	75.							
9.5	73.5							
8.	76.5							
0.	76.5							
1.	76.	73.5	70.5	5, much rippled.			300	SATURDAY, MAY 25th, 1850.—"*In search of Ashton Rock.*"—Midnight to 4 a. m. unpleasant, squally weather with rain—8 a. m to 4 p. m. unpleasant weather with heavy rain—At 11.30 a very heavy squall of wind and rain—The head-rails were washed away by the heavy seas—4 to midnight, moderating and sea going down—At 6 got a cast of the lead with 300 fathoms line; no bottom; temperature as per column—From 6 to midnight, passing showers and squally appearances—Saw a water-spout to the N'd and W'd—While sounding at 6 p. m. noticed indications of a strong current setting to windward (S. E.)—for though, hove to under double reefed mainsail and jib with the bonnet off, and drifting bodily to leeward, the schooner kept to windward of the line—the line tending off to leeward, during the whole time at an angle of 45°.
1.	76.							
1.	76.	73.5	70.5				200	
	76.							
	75.							
1.	71.	70.5	69° 400 fath's.	10, rippled.		1028.3	500	SUNDAY, MAY 26th, 1850.—*In search of "Ashton Rock."*—Commences unpleasant with squally appearances—At 2 a. m. sounded with 200 fathoms line; no bottom; temperature as per column—from 4 a. m. to 8 a. m. pleasant—8 a. m. to meridian pleasant—sounded at 8 (*a sudden great fall in surface temperature*) with 500 fathoms line up and down, and no bottom—this was in latitude 33° 46', longitude 72° 11' 45", by good observations—From meridian to 4 p. m. squally with rain—At 4 p.m. being in the assigned position of Ashton Rock, hove to and sounded with 500 *fathoms line*, and no bottom; temperature as per column—From 6 p. m. to midnight, thick unpleasant weather with squalls and frequent heavy showers of rain—At 11.30 sounded with 100 fathoms; temperature as per column—Saw no indications whatever of a rock or shoal.
	71.		65°			500fath's		
	71.		500 fath's.			1028.3		
			61.5°					
8.	71.5							
2.	71.	69.5	68.					
			500 fath's.				500	
			64°					MONDAY, MAY 27th, 1850.—*In search of Ashton Rock.*—Commencing with, and until 4 a. m., cloudy, rainy, and squally weather—Schooner hove to under foresail—a heavy sea—At day-light made sail—4 a. m. to 8 a. m. unpleasant—8 a. m. to 4 p. m., pleasant weather—A swell setting from the southward and eastward—Saw a few patches of sea-weed, Mother Carey's chickens, and other oceanic birds—4 p. m. to midnight pleasant, with heavy head sea—At 8 sounded with 500 fathoms line—No bottom—Temperature as per column—Saw no indications of a shoal or rock during the day.
1.	70.5	70.	67.					
8.	70.							
8.	68.							
9.	69.							TUESDAY, MAY 28th, 1850 —*In search of Ashton Rock.*—Midnight to 8 a. m., pleasant—Passed sea-weed ranged in parallel lines in the direction of the wind—8 a. m. to 4 p. m., pleasant—At 9 sounded with 500 fathoms line—no bottom—temperatures as per column—Too much sea and drift to get correct temperatures—Lowered a boat to try currents—found a surface current of ¾ knot per hour, setting to the S. E., and an under current of ½ knot setting to N. E—At 11.45 filled away—4 p. m. to midnight, pleasant—At 7 sounded for temperatures, as per column—Ends calm—no indication of a shoal or rock this day—(*Note.*—The great and sudden rise in the temperature of the water, as observed this day, from 9 a. m. to 7 p. m., indicates having touched upon an offset from the Gulf Stream.
9.	68.5	67.5	65.5					
			500fath's				500	
9.	68.		63°					
								WEDNESDAY, MAY 29th, 1850.—*In search of Ashton Rock.*—Midnight until 8 a. m., pleasant—Passed large quantities of fresh-looking sea-weed,

Abstract Log—U. S. Schooner Ta

DATE.		Latitude.	Longitude.	CURRENT.		WIND.		CLOUDS.			
Month & Day.	Hour.	N.	W.	Set.	Velocity in knots per h'r.	Direction.	Force.	Kinds.	Portion.	Moving from.	B
		° ′ ″	° ′ ″								
May 28	8 A. M.	33 36	72 5	South.	0.4	N. W.	Moderate.	Cumulus.	4	N'd & W'd.	29.
	9 A. M.										
	Noon.	33 30	72 14								
	4 P. M.	33 38 30	72 3	Easterly.	0.3	N. W. by N.	Moderate.	Cum. & Strat.	2	Stationary.	29.8
	6 P. M.										
	7 P. M.										
" 29	Midn't.	33 47	71 52			N. N. W.	Light airs, & calm.	Clear.			29.8
	8 A. M.	33 53	71 58	S. 60° W.	1.4	S. E.	Light airs.	Cum. & Strat.	2	Stationary.	29.8
	Noon.	34 0	72 00 30								
	4 P. M.	34 12	72 0	Easterly.	0.5	S. S. E.	Light breezes.	Cir. Cum. N Stra.	5	Southward.	29.8
" 30	Midn't.	34 51	72 9 30			S. E.	Light breeze.	Cumulus.	4	S'd & W'd.	29.8
	8 A. M.	35 28	72 34	S. 81° W.	0.8	S. by E.	Mod. with squalls.	Cum. & Nimb.	9	S'd & E'd	29.7
	9 A. M.	35 33	72 36								
	10 A. M.										
	Noon.	35 51 30	72 45								
	4 P. M.	36 12	72 23 30	Easterly.	1.3	W. N. W.	Fresh.	Cir. Cum. & Nim.	8	N. W.	29.6
" 31	Midn't.	36 16	72 42			N. W.	Light breeze.	Cir. Cum.	9	Westward.	29.7
	4 A. M.										
	8 A. M.	36 47	72 14	N. 77° E.	2.5	N. N. E.	Light breeze.	Cir Cum. Strat.	7	W'd & N. E.	29.3
	Noon.	37 4	72 26								
	4 P. M.	37 27 (no obs.	72 37 cloudy.)			E. N. E.	Fresh.	Cir. Cum. Strat.	8	Eastward.	29.8
June 1	Midn't.	38 18	73 2			E. by N.	Fresh.	Cum. & Nimb.	10	Eastward.	29.8
	8 A. M.	39 3 (no obs.	73 20 cloudy.)			N. E. by E.	Fresh.	Cum. & Nimb.	10	Eastward.	29.8
	Noon.	39 25 (by sight and sou	74 3 ing land, nding.)	S. 65° W.	0.7						
	4 P. M.	39 22	75 53			N. E.	Fresh.	Cum. & Nimb.	10	N. E.	29.8
" 2	Midn't.	39 14	73 42			N. E.	Fresh.	Cir. Cum. & Stra.	8	N. E.	29.8
	8 A. M.	39 11 30	73 25 30	S. 25° E.	0.4	N. N. W.	Moderate.	Cum. Strat. & Cir.	3	N	29.8
	4 P. M.	39 15	73 27 30			N. W.	Light breeze.	Clear.			29.93
" 3	Midn't.	39 38	73 54			W. by S.	Moderate.	Clear.			29.93

ieut. Joseph C. Walsh, Commander.

THERMOMETER.				Tranparency * in fathoms.	Variation observed.	Specific gravity of sea-water corrected to 60° temperature.	Deep sea soundings, in fathoms.
Air.	Water.						
	Surface.	50 fath's	100 fathoms.				
°	°	°	°				
9.	69.5						
4.	76.	76.	500 fath's. 68.	8, rippled.		1028.3	500
9.	77.						
	76.						
	70.	70.5	65.				
4.	70.5						
0.	70.5						
0.	71.	70.5	67.			1028.3 100fath's	
8.	71.	70.5	67.		2° 40' W.	1028.3	
2.	71.5						
0.	71.8	70.5	67.				
	73.						
	77.						
6.	78.5	77.5	72.5	8, rippled.		1028.1	
7.	78.5						
2.	79.	77.	74.				
1.	79.						
6.	74.	70.	64.	5, much rippled.			
6.	70.5	68.5	56.5	6, rippled.		1028.3	
5.	64.	58.5	58.			100	
6.	63.5					1028.2	
9.	61.	60.5	54.				
5.	55.	54.	50.5				
2.	54.						
2.	53.						
1.5	53.						
2.	51.5						
.	55.				4° W.		
3.	53.						

REMARKS.

covered with shells, and ranged in parallel lines with the wind—Passed a strong tide rip in direction N. and S.—8 a. m. to 4 p. m., pleasant—At 10.40 lowered a boat to try currents—found a surface-current of ½ knot setting to the S. E., and an under current at 126 fathoms of 1 knot, setting to W. N. W.—Sounded for temperatures as per column—4 p. m. to midnight, pleasant—Saw several shoals of porpoises—At 7.30 sounded for temperatures, as per column—Ends with lightning to the S. and W.—Saw no indications of a shoal or rock during this day.

Thursday, May 30th, 1850.—Midnight to 8 a. m., rainy, squally, unpleasant weather, with frequent thunder and lightning—at 6 sounded for temperatures, as per column—8 a. m. to meridian, damp, unpleasant weather, with rain—Passed but little sea-weed, many stormy petrels, boatswains, &c.—Meridian to 4 p. m. pleasant—At 1.15 sounded for temperatures as per column—Saw a shoal of porpoises, black fish, and large flocks of sea-birds—4 p. m. to midnight, pleasant—at 6.30 sounded for temperatures as per column—Ends cloudy, with a short, irregular sea. (*Note.*—The rise in temperature of the water at 9, a. m. indicated being on the edge of the Gulf Stream in lat. 35° 33′ N., long. 72° 36′ W. The highest temperature of the Gulf Stream during the day was 79°.

Friday, May 31st, 1850.—Midnight to 8 a. m., pleasant—At 4.15 sounded for temperatures as per column—Passed much sea-weed, and some pieces of rush—water appearing slightly discolored—8 a. m. to 4 p. m., pleasant—at 9 sounded for temperatures as per column—At 1 p. m. sounded for temperatures, as per column—4 p. m. to midnight, cloudy, unpleasant, with rain, and very cool—At 5.40 sounded for temperatures as per column—Saw a shoal of black fish—Ends fresh, with heavy sea from N. E.—(*Note*—At 4 a. m. temperature of surface water having fallen during the hour from 78° to 74°, indicated being upon the inner edge of Gulf Stream—it continued to fall steadily, as per column.

Saturday, June 1st, 1850.—Midnight to 8 a. m. cold, unpleasant weather, with rain—At midnight sounded for temperatures as per column—At 6 a. m. sounded and struck bottom at 30 fathoms—Sand with yellow specks and broken shells—8 a. m. to 4 p. m., cold, unpleasant, and damp weather—At 10 sounded in 19 fathoms—gray sand, with black and yellow specks, and shells—At 10.30 and 11 sounded in 24 fathoms—gray sand, with black and yellow specks and shells—At 12 sounded in 17 fathoms—At 0.10 p. m. made land on lee bow—At 1 p. m. wore ship to the east'd.—A very heavy sea running from the N. E.—4 p. m. to midnight, cold, unpleasant weather, with heavy sea. (*Note.*—The temperature of the water at 5 and 6 a. m. was as low as 51°, a difference of 28° from that of the Gulf Stream.)

Sunday, June 2d, 1850.—Midnight to 8 a. m., pleasant weather, with heavy sea from the eastward—At 2.30 sounded in 22 fathoms—bottom, sand, with black and red specks—At 4 sounded in 26 fathoms—sand, with black specks and broken shells—At 8 sounded in 36 fathoms—sand, black specks and white shells—8 a. m. to 4 p. m., pleasant—4 p. m. to midnight, pleasant—At 8.10 p. m. received on board a New York pilot—At 11.40 p. m. made the light of Navesink.

Monday, June 3d, 1850.—Midnight to 8 a. m., pleasant—At 1, made Sandy Hook Light, bearing N. W. by N. ½ N.—At 8 a. m. Sandy Hook Lighthouse bore N. 54° W., distant 2 miles—8 a. m. to 4 p. m., light variable airs—at 9.30 a. m., falling calm, anchored in 4½ fathoms abreast of Sandy Hook—At 12.40 hove up, and stood in the bay—At 3.40 visited by health officer, and received pratique—At 5 p. m. came to off Castle Garden, in 5 fathoms water.

Note.—During the cruise from St. Thomas to New York, a bottle tightly sealed was thrown overboard every day, containing a paper showing our latitude and longitude, name and date, and request to the finder to forward the paper to Lieut. Maury, Superintendent of the National Observatory, noticing upon it carefully the date and locality in which picked up.

Note.—The "*variations observed*" were generally the mean of sets of azimuths and amplitudes. J. C. WALSH, *Lieut. Commanding.*

D.

Directions for taking Deep Sea Soundings, prepared by the Bureau of Ordnance and Hydrography, under authority from the Secretary of the Navy, dated May 31st, 1850, and issued to the American Navy.

Provide hanks, balls or skeins of wrapping twine. Let some contain 5,000 and some 10,000 fathoms each. This twine should be strong enough to bear a weight of 20 or 30 pounds. It should be as small as consistent with this degree of strength. It should be smooth, having nearly the specific gravity of salt water, so that in sounding at great depths it will not be likely to buoy up the shot or to part with the weight, or from its own friction through the water.

In order to prevent friction, the twine should be waxed or oiled. If oiled, the oil should be put on not more than three days before the twine is to be used.

It should be marked at every 100 fathoms, not by a knot, but by a silk thread tied tightly around.

Let the first 1,000 fathoms on each parcel be marked with a green silk thread wrapped twice about the twine and tied; then the 100 fathoms (from 100 to 900 inclusive) marks may be designated by a silk thread drawn between the strands of the twine as many times as there are hundreds to be marked.

In like manner mark 2,000 fathoms and its intermediate hundreds with a white silk thread. The 3,000 and intermediates with a blue. The 4,000, &c. with red. The 5,000, &c. with a black. The 6,000, &c. with yellow, and so on up to the 10,000 fathoms with other colors, or with striped threads.

The object is to attach these threads to the twine in such a manner as not to make knots, or rough, or uneven places by which the sounding line may catch.

Provide several large and light spools or reels on which the twine is to be reeled before proceeding to sound. These spools should be large enough and light enough to give line to the shot, as fast as the shot will take it, without danger of breaking.

Sling the shot to serve as the sounding weight by passing two straps of canvass, ½ inch broad, about it in such a manner as to hold, and as to have the straps to lay smooth and without knots or wrinkles about the shot. Let the sailmaker with his needle secure the sounding line to these straps, or leave a loop of strong twine to them to which the line may be tied.

Use one or more 32 lb. shot at a time according to the depth of the sounding, and the suggestion of experience. Sound at least once a day and give the latitude and longitude of the sounding with as much accuracy as possible, together with the depth, stating the allowance that is to be made for slack or stray line.

When the shot touches bottom, as will be known by the turning of the reel, break the twine and enter on the log—state the length of the part lost; this length should be determined accurately by measuring from the broken end to the next 100 fathom mark.

Unless at very great depths the most convenient sounding line will be a strong fishing line, say three of 5,000 fathoms each, marked at every 50 fathoms, wound on reels by which they may be reeled up rapidly.

The line should be smooth, with strength enough to bear a weight of 50 or 60 pounds; attach a bit of cork (the stopper of a champagne bottle will be large enough) to the lower end; toggle or tie the line on to the shot by a thread that will part on attempting to pull the shot up. When the shot touches bottom, haul on the line, detach it from the shot and the cork will bring the end to the top, and thus make the reeling up more easy.

With this line should be used a sounding nipper, which gives the exact depth up and down.

E.

Captain Platt to Commodore Warrington.

U. S. Sloop of War Albany, Harbor of St. Thomas, Island of St. Thomas,
December 18*th*, 1850.

Commodore Lewis Warrington,
Chief of Bureau of Ordnance and Hydrography,

Sir:—In conformity with your instructions, I have the honor to report the results of our attempts at deep sea soundings.

Our *first* sounding, made with the line provided by the Department for that purpose and a thirty-two pound shot attached, was attempted on the 6th of December, in lat. 38° 38′ North, and long. 66° 31′ West, both by dead reckoning. At this time, bottom was found with 1,625 fathoms of line which ran out in 27 minutes.

On the 7th and 8th of December, the weather was too rough to admit of sounding.

On the 9th of December, being by dead reckoning in lat. 33° 34′ North, and long. 61° 38′ West, we found bottom with 1,950 fathoms of line, running out in one hour and three minutes, with a drift of one mile. On this day, six shots were lost in unsuccessful efforts, the line parting with the heaving of the ship. A bar of iron, weighing 12 pounds, was also tried without success. The result was at last obtained by means of a bar of lead, weighing 13 pounds.

On the 10th of December, no sounding was attempted in consequence of the rough weather.

On the 11th of December, our *third* and *fourth* soundings were effected. The *former* was taken in latitude, by observation, 30° 05′ North, and longitude, by chronometer, 58° 12′ West, with 1,000 fathoms of line, running out in eleven minutes. The *latter* sounding was made in observed latitude 29° 58′ North, and longitude 58° 48′ West, with 1,500 fathoms of line running out in twenty-eight minutes. The former sounding was effected under a light breeze, and the latter in a dead calm, during which the ship had no perceptible drift. Eleven shots were expended before the soundings of this day were secured.

On the 12th of December, after lying to for two hours, nothing was accomplished. Five experiments were made with an oiled line, running out respectively 600, 20, 300, 550, and 200 fathoms. Two experiments were also made dispensing with the oil, the sixth shot for the day being lost at a depth of 200 fathoms. The seventh and last sounding for the day was made with three bars of iron lashed together, and having an aggregate weight of twelve pounds. The line parted near the reel, after 1,000 fathoms had been run out.

Our time until the 16th was spent in waxing the twine, preparatory to other experiments. On this day, in observed latitude 21° 34′ North, and longitude, by chronometer, 63° 23′ West, the line ran out in 28 minutes, and parted at 1,600 fathoms.

This is the extent of our experiments, and the best results we have been able to attain. I am convinced, from the frequent parting of our line under such various circumstances, with reduced tension, at such different lengths, with equal strain, and with repeated marks of fracture in the strands, that the twine furnished was not suitable for our use. If the knots had been well fastened, and the strength of the line equal in all its parts, results more satisfactory to ourselves and more valuable to others might have been obtained.

I have reason to commend the perseverance and scientific skill with which these experiments have been prosecuted by Lieut. Taylor. I am confident that every effort within our power was made by him to render these soundings as complete and accurate as the materials furnished us would warrant.

Since discovering the defectiveness of the line, and observing its liability to fracture, especially at great lengths, I have been suspicious that in no case we had reached the bottom, although the cessation of the strain upon the line had been regarded as indicating a legitimate sounding.

About 14,000 fathoms of the sounding line supplied us yet remain, with which I shall continue experiments at the first opportunity.

I have the honor to be, respectfully
Your obedient servant,
CHARLES S. PLATT,
Commanding the Albany.

F.

Extract from a letter to the Prussian Minister, Baron Von Gerolt, dated, National Observatory, June 20, 1850.

" Speaking in advance somewhat of my publication, but leaning, nevertheless, upon the indications already given by the investigations which are in progress at this office with regard to the winds and currents of the sea, and the phenomena connected therewith, I may remark that certain conclusions have been forced upon me, with such veri-similitude, that it only remains for Professor Ehrenburg, with his microscope, to write the final Q. E. D. to them.

For instance, my investigations of the winds at sea, so far as they bear upon the subject, seem to indicate that the rivers and fresh water of the Northern temperate and frigid zones, are, for the most part, evaporated from the south torrid; or, more properly speaking, that they are taken up from the sea by the S. E. trade winds. Such at least is the indication; and certain facts so tend in their bearings, as to convert this indication into a conclusion that does not appear altogether forced.

As a general rule, most of the land is in the Northern, and most of the water in the Southern hemisphere. But notwithstanding the absence of evaporating surface in the Northern hemisphere, most of the precipitation takes place there, if we regard the waters that are discharged into the ocean by the rivers as an expression of the excess of the precipitation over the evaporation that takes place in the basins drained by these rivers. The basin of the Amazon is in both hemispheres; it is, therefore, common, and should not be counted as peculiar to either. The Rio de la Plata is the only great river then in the Southern hemisphere; whereas, in the Northern, are all the rivers, great and small, which give drainage to Europe, Asia, and America.

The question then comes up: Does the Atlantic afford evaporating surface sufficient to supply all the rivers of Europe and America with rain water? and, if so, by what winds do the vapors, that make these rains, travel both east and west from the same place?

Very little of America and no part of Europe is within the region of the N. E. trade winds; and the trades, because they come from a colder and go to a warmer climate, are eminently evaporating winds. But how is it to the North of the N. E. trade winds, where, on the surface of the earth, the S. W. are the prevailing winds? Here, as a general remark, the winds are going from a warmer to a colder climate, and therefore ought, it would seem, to precipitate more than they evaporate. Thus, take the isotherm of 60° Fahr. in the Atlantic, as an example: the mean dew point, we will suppose along this line, is between 50° and 60°, or at any other degree below 60°—suppose 55°—that we may choose for the illustration.

Now let us proceed still further North in this ocean until we reach the isotherm of 30°: on this line the mean dew point must be below 30°, how much we cannot say, nor is it material for the illustration that we should say. It is certainly below the mean dew point of 60°. Now what becomes of the vapor that has caused the mean dew point on the isotherm of 60° to change to that which belongs to the isotherm of 30°? It has been precipitated, and the capacity of the air to retain moisture has been lessened proportionably. In thus viewing the case, the question arises: Whence are the vapors taken which supply with rain, the sources of the rivers of the North temperate and frigid zones?

You will understand me as speaking in general terms, without regard to any of the exceptions caused by anomalies, such as the Gulf Stream and the like.

Where the N. E. and S. E. trade winds meet, they produce what is known as the belt of equatorial calms. This is one of the valves in the great atmospherical machine, through which the air that is brought from the North and the South by these trade winds, rises and escapes into the upper regions of the atmosphere, and thence returns to supply the sources of the trades with fresh air to make more winds of.

Now the question is: Does the air which is brought to this valve by the S. E. trades continue on towards the North in the upper regions of the atmosphere, while that which comes down as the N. E. trades continues on towards the South in like manner? or, does the air which the S. E. trades bring to this calm place, rise up and return to the South? or, does the air of the two trades intermingle here, and go, a part of it indiscriminately, either to the North or to the South as chance may determine?

I am inclined to favor an affirmative reply to the first of these interrogatories; and for these reasons, in addition to those already alluded to:

1st. Winter, late fall, and early spring, are the seasons of our greatest precipitation; and this is the time when the sun is pumping up the vapor with the greatest energy from the Southern, and with the least from the Northern oceans—and so too when the sun is pumping up vapor from the Northern hemisphere with all his energies, precipitation is most active in the Southern.

2d. The belt or band over which the S. E. trades prevail is much broader than that over which the N.E. trades prevail; consequently, supposing the velocity of each trade-wind to be the same, or nearly the same, the S. E. trade takes up more moisture because it sweeps over a broader belt of ocean; and, sweeping over a broader belt, it remains longer in contact with the evaporating surface; and consequently it may be supposed, it brings more moisture to the belt of equatorial calms whence the ascent takes place.

A large portion of this moisture is deposited in the equatorial calms, which we know is a region of constant precipitation. But where is the rest precipitated—in the Northern or Southern hemisphere? In the former, I suppose; because the rivers and the rain gauge, as far as it has been observed, tell us that the total amount of precipitation in the Northern, is greater than that in the Southern hemisphere; indeed, it is not necessary to consult the rain-gauge to learn this; the rivers themselves are sufficient rain-gauges for this purpose; for we have only to consider the volume of water annually discharged into the ocean by northern rivers, to see in it an expression for an amount by which the total precipitation is in excess of the total evaporation which takes place in the whole extent of valleys drained by such rivers. Search the Southern hemisphere for a like quantity, and the search will be in vain.

Seeing, moreover, that the Southern hemisphere has more water and less land than the Northern; that it has less rain and fewer rivers, it seems as though, in likening the atmosphere to an immense machine, we might call the Southern seas the boiler, and the Northern continent, the condenser for the mighty engine.

There is, perhaps, another point upon which an argument, not altogether without plausibility, may be turned in favor of this hypothesis.

The grounds for this argument are drawn from probability, and the argument itself rests on the degree of belief and faith we have in the perfection of terrestrial adaptations.

To state the argument in this point of view, we must consider the atmosphere, not only as a great condensing machine, but as an immense sewer, in which vast quantities of corrupt animal and vegetable matter are continually being cast for re-elaboration, purification, re-arrangement, and re-adaptation to the purposes of the animal and vegetable kingdoms.

Notwithstanding the quantity of matter that the plants and animals of the earth are continually taking from the atmosphere on the one hand, and are as continually casting into it on the other, so admirably arranged is it, and so perfect its system of circulation, now across the seas, now through forests, and again over deserts, burning sands, and frozen heights, that its proportions are never destroyed.

In this system of purification and preservation, we know that vegetation in active growth has much to do.

Now, then, if we consider that the N. E. trade winds, when they arrive at the equator, ascend, return to the North in the upper regions until they reach the parallel of 30° or 40° North, where they descend to the surface, and are known as what the Germans style the S. W. passage winds; if, I say, this be the course of atmospherical circulation, we shall see that the air in our winter time, when vegetation is asleep with us, would probably not be exposed to the processes necessary for its purification; and finally, if such were the system of circulation, the atmosphere of the Northern hemisphere would, in process of ages, probably become different from that of the Southern hemisphere.*

We have no reason to believe in the existence of any such change in the components of the atmosphere; and I had almost said, *therefore*, in any such partial system of circulation.

On the other hand: if we maintain that the S. E. trade winds blow North after ascending into the upper regions of the atmosphere through the equatorial calms, and that it is those winds, and not the N. E. trades that in their circuit blow our S. W. passage winds; if, I say, we maintain this, we shall see the beautiful adaptation for exposing them to the proper and wholesome vegetable agencies; our winter is the Southern summer; then the S. E. trades blow through the Southern forests which are then in their stage of activity.

Arrived at the equator—properly prepared for the use of the inhabitants of the North temperate and frigid zones—they ascend into the clouds; and, after reaching the parallel of 30° N., they descend, and are then felt as the vigorous, wholesome, and healthful S. W. passage winds of the Northern winter; continuing on towards the North frigid zone, they perform their office for the inhabitants of those inhospitable climates, and approaching the polar regions in spirals, they whirl continually around or about the pole in a direction contrary to that of the hands of the watch.

Returning thence in the upper regions towards the South, as unfit for further use, they are not felt on the surface within or near the tropics, where vegetation is again in activity, to fit them for the inhabitants of that region; reaching the equatorial calms, they ascend, and are next felt on the surface in the South temperate zone as the N. W. passage winds.

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* The extra-tropical regions of the North have much more land, and therefore it may be supposed many more organs than the South to breathe, consume, and vitiate the atmosphere; consequently in any given time, as in a Northern winter, the demands upon the atmosphere are very unequal on opposite sides of the equator. On one side, the animal kingdom is exacting from it in excess—on the other—the Southern summer—the vegetable.

Speaking in general terms, it may be said that man with his retinue of domestic animals, counts in the South but as one in a thousand at the North. These myriads of warm-blooded animals in excess, with the fires kindled by man in his Northern winter, leave us to infer that more air is required for animal consumption and combustion on one side of the equator than on the other, especially in our winter.

The air thus used, loses the proportions of gaseous combination required to make it wholesome; whence, therefore, is it purified? Not by the vegetation of the extra-tropical North, certainly, for its vegetation is then asleep.

But if we make this air return to the South by the route suggested, it will pass through the N. E. trade-wind region, and be partly replenished by the perpetually active vegetation there. Then rising in the equatorial calms, and overleaping, in the upper regions, the S. E. trades, it descends to the surface in the extra-tropical South, where it is summer, and where the forces of vegetation are in their most active operation.

Returning in the upper regions towards the North, from this part of its circuit, it first strikes the surface again as the S. E. trades, where vegetation is again perpetually active. Being now completely purified, it rises up again in the equatorial calms, overleaps in the upper regions the N. E. trades, and descends in the extra-tropical North, fresh with supplies in wholesome proportions for breathing lungs and winter fires.

And thus, though we cannot tell the reason why this earth was provided with zones of perpetual summer, alternate winter and opposite seasons, we may nevertheless see through the atmosphere one of the purposes for which this arrangement of seasons, combination of climates, and proportion of vegetable surface was intended to subserve.

In this view we see room for the harmony of nature. We have not a single physical fact going to prove that such is *not* the course of the circulation of the atmosphere about the surface of the earth; but we have many facts and circumstances which, though they do not prove, yet they suggest, that such is the course.

Thus, using a figure of speech, we may liken these evergreen places through which the winds go and return, to the lungs of the earth, with their three lobes: one in each of the two trade-wind regions, and one now at the North, now at the South, changing from one side to the other, as the summer comes and goes.—M. F. M.

Continuing on towards the South pole, and approaching it in spirals, they whirl about, but in a direction with the hands of a watch, and opposite to that which they took about the North pole.

Ascending into the upper regions of the atmosphere, they are next felt on the surface as S. E. trade winds; reaching the equator, ascending, and coming over into the Northern hemisphere, they are again felt to the North of the N. E. trades as the S. W. passage winds.

Let us suppose that this part of the circuit from the Antarctic regions be made in our summer, and of course in the Southern winter, when the vegetation here is not so active in its demands upon this atmosphere in motion, as it was in the other part of the supposed circuit.

But there this same atmosphere that has been but partially purified for Northern use in the Southern forests and fields, reaches us in our summer, when vegetation is in full activity, and when, therefore, all disproportions are properly compensated.

I have faith in the "great first thought." I believe that the animal and the vegetable kingdoms are in exact counterpoise; that through the dominions of nature all things are in exact and rigid proportions; that there is not a green leaf too much on one side, or an insect too many on the other. And because of this belief, I find plausibility and satisfaction in supposing that the general system of atmospheric circulation is as I have been endeavoring to represent it.

In this belief I am strengthened by my reading of a text of Scripture, (and the Bible no more than Nature can be wrong, for the Author of both is One,) which seems to apply to such a system of circulation:

"The wind goeth toward the South, it turneth about unto the North, it whirleth about continually; and the wind returneth again according to his circuits."

Compare this with what I have already said, and which my investigations taught me was the probable course of atmospherical circulation before I remembered me of what Solomon had said, and I think you will find with me, not proof, but grounds to suppose that such may be the system of circulation.

Cannot Professor Ehrenberg afford us the proof? Has he not discovered in the rain-drops, or the snow-flakes, or the hail-stones of the northern temperate, or frigid zone, infusoria, or microscopic organisms of the Southern hemisphere? He has.

I have requested my friend Lieut. de Haven, who has sailed in command of the American expedition in search of Sir John Franklin, to collect for me specimens of colored snow, rain, and hail. I made this request with the hope that a microscopic examination would lead to the discovery of some animalculæ or other foreign matter in them, which would serve as a clue to guide me to the place whence the water that is precipitated there was probably evaporated.

Would the Professor, think you, be willing to undertake the examination of such specimens, provided they be obtained?

I find since writing the above, by looking over his work which you are so kind as to lend me, and which I received the moment before commencing to thank you for it, that in his microscopic examination of sea-dust and bloody rain, he has already thrown much light upon this very question; his researches bear directly upon my investigations here touching the winds and currents of the sea.

In Lyons and Genoa both he has found microscopic organisms to fall from the air, and the "father-land" of some of these creatures he traces to South America. What a beautiful link, bright and strong, is not this in the chain of evidence circumstantial and direct, tending to prove that the general circulation of the atmosphere is such as our investigations indicate it to be.

According to this—according to the indications of the wind and current charts, and the unpublished results derived from the investigations carried on at this office, if "trade-wind dust" or "blood-rain" could be found in Oregon and the regions thereabout, I should expect, were specimens sent to Professor Ehrenberg, that he would discover in them organisms whose *habitat* is Polynesia.

I shall make inquiries for drops of blood-rain, colored snow, hail-stones, and specimens of showers of dust from that quarter. * * * * * * * * * *

Respectfully, &c.,
M. F. MAURY.

G.

EXTRACTS FROM EHRENBERG'S WORK ON "*The Dust of the Trade Winds and Blood Rain, a great Organic invisible working and Life in the Atmosphere.* Berlin. 1849."

Translated by Prof. Hubbard, U. S. N.

[p. 1.] I.

"*About a Dust-Rain which filled for a long time the whole air in the North Atlantic, in* 17° 43′ *N. lat., and* 26° *W. long., and its commingling with numerous Flint-Shell Animalcules.*

[Communicated to the Berlin Academy May 23, 1844.]

"Mr. Darwin, the well-known and meritorious English traveler and writer upon coral reefs, narrates, in the history of his travels, that at the Cape Verd Islands, and on the high seas of that region, during his presence there, a fine dust constantly fell from the atmosphere; and that ships which were 380 nautical miles from land were, according to his written communications, surprised by it. The wind blew at that time from the African coast. Of this dust which fell upon the high seas at so great a distance from land, Mr. Darwin has sent a specimen for my microscopic investigation. Hitherto this dust, so frequent there, has been, on account of its yellowish red color, taken for volcanic ashes. Microscopic analysis has clearly shown that a considerable part, perhaps one-sixth of the whole, consists of flint-shelled polygastrica, and parts of well known flint earth terrestrial plants, as follows:

A. Flint-shelled polygastrica.

&c. (pp. 1, 2.) &c.

[p. 2.] The best known European forms contained in this catalogue prove:

1. That each meteoric dust-rain was of terrestrial origin;

2. That the same was no rain of volcanic ashes;

3. That it was necessarily a dust raised up to a great height by a strong current of air or whirlwind from a dried-up swamp region;*

4. That the dust came not necessarily nor in accordance with demonstration from Africa, although the wind blew from thence as the nearest land, when the dust fell, because there are in it no forms whatever exclusively native to Africa;

5. That, since the *Himantidium Papilio*, a very peculiar form, has been hitherto detected only in Cayenne, (see the "Microscopic Life in South and North America," 1842, Plate II., Fig. 4,) and the *Surirella* is perhaps an American form, only two conclusions are before us: either the dust was raised to the upper strata of the atmosphere in South America, and by changed currents carried in various directions, or [3] the *Himantidium Papilio* and the *Surirella* are to be discovered elsewhere, that is, in Africa.

Consequently, since in some cases the organic or terrestrial origin of the meteoric dust-rains, or supposed ashes-rains, within 300 miles from land, has been put beyond doubt, it becomes us now to examine all similar phenomena with reference to the same question; and the direction of the wind at the time they occur will not indicate with certainty the source from whence they came."

II.

"*Further Investigations of the Atmospheric Dust from the Atlantic Ocean and the Cape Verd Islands.*

[Communicated to the Academy Feb. 27, 1845.]

"Mr. Charles Darwin has sent five new specimens of similar dust for comparison. They were all collected in the years 1834 and 1838, in 15°, 17°, 19°, and 21° North latitude, on ships partly in St. Jago itself, partly on the high seas, many hundred miles from land.

This dust, formerly supposed by observers to be volcanic emissions, or African desert-dust, was, according to the previous specimens, distinguished as being filled with thirty-seven kinds of flint-shelled infusoria and phytolitharia, and therefore excluded from cosmical or volcanic relations; and it was also remarked that there were therein scarcely any of the already well-known forms peculiar to Western Africa; that on the other hand, there were two forms, *Himantidium Papilio* and *Surirella Peruviana*, peculiar to South America, below the equator.

The present more recent materials and investigations have shown us, in addition to the thirty-seven already found, yet thirty other small bodies, so that now from the atmosphere over that part of the ocean there are sixty-seven known organic forms, viz: 32 flint-shelled infusoria.

34 flint-earth phytolitharia.

1 polythalamium, with chalk shell.

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* Probably from the plains of the Oronoco, which are flooded for one part of the year, and parched up for the other. According to the general system of atmospherical circulation which the "Wind and Current Charts" have developed, the atmosphere which passes over those plains should, after ascending, flow in the direction in which this dust was gathered.—M.

[4] Hitherto, only fresh-water forms had been observed, which could only come from the interior of continents, but now we can also perceive some true marine forms, which compel the opinion that the dust came from a coast region.

Textilaria globulosa? Grammatophora oceanica.

Among all the thirty additional forms, there is only one of a new kind, *Eunotia longicornis,* and this has already appeared in a very similar form in a Hungarian fossil stratum.

There is, moreover, among these thirty forms, not one peculiar to Western Africa; generally speaking, none peculiar to the African continent: but there is there the *Lithostylidium Rajula,* a flint-shelled animalcule like the egg of the ray-fish, which was previously known to the author as belonging to the Isle of France. On the other hand, the South American forms have been increased by four: *Eunotia quarternaria, Pileus, tridentula, Amphidiscus obtusus;* the three *Eunotia,* however, have hitherto been known only as from Senegambia and Guiana.

To all the six specimens of the Atlantic atmospheric dust, four organisms are common; many more, that is thirty-seven, occur similarly in several specimens. I now consider myself justified in the conclusion that all the Atlantic dust may come only from one and the same source, notwithstanding its extent and annual amount, which appear so great.

The constant yellow and reddish color of the dust, produced by ferruginous matter, its falling with the trade winds and not with the harmattan, according to the express account of an experienced sailor, (Sabine,) increase the interest of the phenomena.

The *Eunotia triodon,* a northern form, is very unexpected in three of the specimens.

Forms which fell living from the atmosphere have not yet been observed.

Meyen had in 1836, in his voyage round the world in a Prussian merchant ship, observed near the Cape Verd Islands, the sails of the vessel reddened to windward, and remarked that it was caused by a small plant produced by *spontaneous generation,* and rapidly decaying. He called the plant *Aerophytum tropicum.* And in precisely the same manner the dust appeared, according to Mr. Darwin's communication, on the sails and rigging of the ship in the dew of the morning, and contains the above mentioned sixty-seven flint-earth organisms. [5] On drying the sails, the wind blew the dust rapidly away. The *Aerophyta* were therefore, perhaps, only the dew-pearls."

Abstract of the Organic Forms of the Atmospheric Dust in the Atlantic Ocean till Feb. 1845, *&c., &c., &c.*

[pp. 5, 6, 7.]

III.

[7] "*About an Atmospheric Dust which fell in Malta on the* 15*th of May,* 1830*; its contents of Microscopic Organisms, and its similarity to that of the Atlantic Ocean, near the Cape Verd Islands.*

[Communicated Nov. 20, 1845.]

"Mr. Charles Darwin has sent a new atmospheric dust for investigation, which Purser R. G. Didham had collected on the ship Revenge, on the 15th of May, 1830, at Malta. Mr. Didham had first given this substance to Mr. Lyell, who gave it to Mr. Darwin, and the latter to me. I received the original package now before me in white letter paper, with the inscriptions of the different owners. By the collector it is remarked that the atmosphere was at the time orange yellow and thick, and that the collected dust fell down with a shower of rain. The wind was E. S. E. Moreover, he remarks, that he was in the same ship on the 15th of May, 1834, in Palmas Bay, near Sardinia, and observed the same phenomenon.

The microscopic analysis of this (perhaps sirocco?) dust from Malta, which is also of a reddish color, has given the following contents of microscopic recognizable organisms, &c. [p. 8.]

[8] There are 15 Polygastrica, 21 Phytolitharia, 7 Polythamia—43 kinds in all.

Of these 43 kinds, all marked with asterisks (31 in number), have been similarly observed in the dust of the Cape Verd Islands, as may be seen from the previous communications.

There are, therefore, in the earlier and this last result of the atmospheric precipitation 31 similar kinds, and 12 are observed at Malta, which did not occur in the dust of the Atlantic Ocean. Among these 12 forms there is again very probably one which hitherto has only occurred in Chili: *Synedra Entomon*? On
[9] the other hand, there is a flinty plant which as yet has been only observed at Ascension, South Africa and India: *Lithostylidium Taurus*. The *Discoplea* is a hitherto unknown and not yet completely ascertained form. Most decided of all are the numerous Polythalamia and some sea-needles.

The conclusions to which we are *compelled* by these observations are in my opinion the following:

1. It is exceedingly striking that the dazzling white sand of Sahara in Africa, which the E. S. E. wind should carry to Malta, comes down there exactly as that which should come from Senegal to the Cape Verd Islands, orange-colored, giving to the whole atmosphere the same hue, and very clearly owing its color to sundry iron oxides (Gallionellen?) In the Sahara of eastern North Africa, I have myself for six years seen the sand-surface only blinding-white (of chalk and sand-plains), and other travellers have reported the same. The fine dust of the Chamsin I did not see orange-colored; it was always gray.

2. I have indeed also observed in Africa many of the organisms present in the dust, but of the *characteristic* African forms which are present there are altogether too few. *Lithostylidium Taurus* is common to Asia and Africa.

3. Besides the want of purely African forms, and the agreement in many general wide-spread forms, the meteor-dust of Malta is also strikingly like that of the Atlantic Ocean in this respect, that both contain predominantly fresh-water species, and that marine species, not readily supposable in the inland countries, are mingled in with these. The intermingled Polythalamia, which are more common in the Malta dust, belong to a chalk sand, since three of them are identical with chalk animals; but others are not known in the chalk, and these spongoliths all belong, together with the chalk animalcules, to the present epoch.

4. Moreover, the commingling in the contents of the organic matter is, as respects volume, so great in both collections of dust, that we must infer their origin from a common source. *Gallionella granulata* and
[10] *procera*, together with the terrestrial Phytolitharia, predominate in both in the number of individual specimens, and their forms were recognised in every, the smallest part subjected to examination.

5. By the *Synedra Entomon*, as a characteristic form for Chili, we are again brought back to South America.

6. No trace leads us to volcanic relations of the dust. Neither a melted nor a frozen condition can be perceived. The reddish oxidation of iron is, as is well known, no indication of this.

7. The great geographic extent of the phenomenon of a reddish dust nearly filling the atmosphere, and itself filled with so similar organisms, many of which are characteristic for South America, not merely allows, but demands, more earnest regard to the probable cyclical relations in the upper and lower atmosphere, whereby very great masses of fixed terrestrial matter, earths and metals, and especially flint-earths, chalk, iron and coal, apparently heterogeneous, and yet related by certain peculiarities, are held swimming in the atmosphere, now like clouds thinly spread by whirlwinds or electricity over a broad space, and now condensed and (like the dust of the fir blossoms) falling in showers in every direction.

8. The showers with E. S. E. wind, and the thick orange-colored atmosphere, may be caused by accidental rain-clouds in the sirocco, and have no necessary connection with it.

9. The following questions now appear to obtain importance: Is the sirocco of southern Europe, which hitherto has been taken for the hot wind of Sahara (the continuation of the Samum or Chamsin), but which in its dust shows characters apparently foreign to Sahara and Africa, is this always and to the same extent laden with iron and infusoria? Can such a phenomenon have its rise from known regions of Central Africa?

The scientific answer, either affirming or denying, can of course be only the result of continued inquiry."

[11]

IV.

" *About the Sirocco Dust which fell at Genoa, on the* 16*th of May*, 1846, *its Organic Composition, and great similarity with the Atlantic Meteor-dust.*

[Communicated June 11, 1846.]

"The Sicilian and Genoese sirocco-storms in May, 1846, have, with much misfortune brought also a peculiar scientific gain.

On the 16th of May, according to a letter sent to me from Professor Pictet, at Geneva, an atmospheric dust fell, which covered the roofs and streets of the city in great abundance. A friend had sent to Mr. Pictet a specimen, and on the 30th of May I received it in Berlin for examination and comparison with the previously-mentioned kinds of dust from the atmosphere.

This specimen, carefully preserved in white paper, is of a pale yellow ochre color, and microscopic analysis has detected therein the following organisms of the smallest type of life:

Meteor-dust of the Sirocco of Genoa, May 16, 1846.

A, &c. &c. (pp. 11, 12.)

[12] The open-printed forms (6 in number) are peculiar to the meteor-dust of Genoa.

This result of such a rich organic mixture is indeed no longer surprising, but yet, for many reasons, of great interest. Previously, in the communication respecting the meteor-dust of Malta, attention was called to the still undetermined character of the European sirocco-dust, and the remarks published at that time seem to have incited this recent communication.

Hereby we have obtained the first direct experience that the European sirocco-dust, which had been traced back as from Africa, brings with itself the meteor-dust of the Cape Verd Islands, and a common form has been already directly known through the dust of Malta.

The kinds of dust fallen since the year 1830 in the Atlantic Ocean, near the Cape Verd Islands, in Malta and in Genoa, all agree in the following characters:

1. They are always of a yellow ochre-like color, not grey like those of the Chamsin in North Africa.

2. This yellow color is produced by iron oxide.

[13] 3. They contain from $\frac{1}{6}$ to $\frac{1}{3}$ of their mass of determinable organic parts.

4. The organic intermingled forms are partly flint-shelled remains of polygastric infusoria, partly fragments of flint-earth plants *(Phytolitharia)*, partly carbonaceous but uncarbonized fragments of other plants, and partly chalk-shelled *Polythalamia*.

5. Of the now determined 90 kinds of such organisms, the greater part occur similarly in the dust which fell at points geographically far apart.

6. Of the 46 species in the Genoese dust, only 11 are wanting in the previous collections.

7. The predominant forms, numerically, are the fresh-water and land forms; but the dust which fell in the ocean at the Cape Verd Islands at Malta and Genoa,[*] contains also marine animalcules, so that it appears to have been brought from a coast-region, or to have been mingled in the atmosphere with predominating fresh-water forms. *Diploneis didyma* is a decided marine form in the dust of Genoa; *Spongolithis Fustis* a probable one.

8. Above all, especially striking and remarkable is the manner in which all these kinds of dust are so mixed, that not only infusoria and the similar kinds are in them, but that in all the same species predominate, as regards the number of individuals. Thus again, in Genoa, the *Gallionella granulata* and *procera* have appeared as the principal forms.

9. None of these kinds of dust have as yet presented living forms dried up in them. They were always empty shells and fragments.

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[*] Where rain-dust is found in the Northern hemisphere, if a line be drawn thence in a direction about S. W. or W. S. W. to the S. E. trade wind region, it will pass near the localities whence according to theory the rain-dust should take its rise.

The air which the S. E. trade winds discharge into the belt of equatorial calms, after ascending, would, if it pass into the Northern hemisphere, take, in the upper regions, on account of diurnal rotation of the earth, a direction very nearly opposite to that of the N. E. trade winds; that is, it would appear to come from the southward and westward, and to go to the northward and eastward, and this is the direction of the valleys of the Oronoco and Amazon, and other parts of the trade wind regions of South America, from all the localities whence specimens of the rain-dust, examined by Professor Ehrenberg, should come.

Hence the same atmospherical current which conveyed the South American infusoria to the Cape Verd Islands might convey it to Malta and Genoa, and should the distinguished microscopist have an opportunity of examining rain-dust from that extensive system of river basins which is drained into the Black Sea, particularly the Southern portion of it, I should expect such examination to give the same general results which the rain-dust of Malta, Genoa, and the Tyrol give. On the other hand, if rain-dust be ever known to fall near the Cape of Good Hope and in Southern Africa, it is probable that the microscope would detect in it the sirocco-dust and infusoria from Sahara, Senegambia, and other parts of Africa, within the zone of the N. E. trade winds.

In like manner, in the rain-dust of New Holland, if rain-dust fall there, should be found infusoria of India; and in certain parts of India, Polynesian forms.—M.

10. None of these kinds of dust have exhibited molten, frozen, or carbonized forms. They are loose particles dried without heat.

11. And the dust of Genoa, notwithstanding its direction from Africa (as indicated by the sirocco), has shown as few characteristic African forms, such as are contained in every small mud-particle in Africa, as were found in any of the previous dust. On the contrary, the *Synedra Entomon*, a characterizing form of South America, is here present.

[14] It must also not remain unremarked, that the seeds of the burnt mushroom *(Phragmidium)* are intermingled with the meteor-dust of Genoa. Moreover, it is worthy of notice, that the European observations, hitherto so few, have been always made on the 15th and 16th of May, in different years (at Malta, Sardinia, Genoa.)

A chemical analysis of the meteor-dust of the Atlantic Ocean has been made by Mr. W. Gibbs of New York, in Mr. H. Rose's laboratory.

		Independent of Water and Organic matter.
Water and organic matter	= 18.53	
Flinty earths	= 37.13	= 45.575
Clayey earths	= 16.74	= 20.547
Iron oxide	= 7.65	= 9.388
Oxide of manganese	= 3.44	= 4.222
Carbonic acid chalk earth	= 9.59	= 11.648
Talc earth	= 1.80	= 2.209
Alkali	= 2.97	= 3.645
Natron	= 1.90	= 2.332
Oxide of copper	= 0.25	= 0.306
	100.00	100.00

The greater part of the flint earth comes evidently from including the Polygastrica and Phytolitharia; the large amount of iron from the Gallionella, since these predominate, and thence perhaps also the manganese. The carbonic acid chalk earth corresponds tolerably well to the smaller number of Polythalamia. The clayey earths may be there as foreign dust. Alkali, natron, talc earth, copper, are chemical, small, microscopically not very certain contents.

The following review illustrates the extension of the same meteor-dust, according to our present experience:

In area. { The Atlantic Ocean to 800 nautical miles west of Africa,
Cape Verd Islands,
Malta,
Genoa, } Substance similar.

In time: 1830! 1834! 1836? 1838! 1846!

Therefore, this yellow meteor-dust has for 16 years, and at great geographical distances, shown a constantly uniform character.

[15] Although far from attaching any weight to a hypothesis, yet I consider it a matter of duty to seek for a connection in the facts, and feel myself therefore urged on and compelled, on account of the above-mentioned particulars, and so far as they will justify a conclusion, to suppose an atmospheric current, joining America and Africa in the region of the trade winds, and sometimes, particularly about the 15th and 16th of May, turned towards Europe, and bringing with it this so peculiar, apparently not African dust, in countless measure. If we will not attack hypothesis by hypothesis, but rather with united effort add scientific observations upon observations, then will the explanation of these mysterious relations, so intently claiming our study, progress rapidly."*

V.

" *Communications respecting the Microscope Analysis of the Sirocco dust and blood-rain which fell on the* 17th *of October*, 1846, *in a violent hurricane at Lyons.*

[Communicated 1846–47.]

"By the results gradually published during the last two years of investigation of different kinds of meteor-dust, whereby the action of the sirocco has been brought into nearly direct connection with phenomena of the distant Atlantic Ocean, Dr. Lortet of Lyons has been induced to send for my examination a specimen of the sirocco-dust, which fell on the 17th of October, 1846, at La Verpillière between Lyons and Grenoble, in the destructive hurricane of that date. His letter, of the 28th of October, contains the following brief picture of the attending circumstances:

" The storm came over the mountain chain of the Ardèche District, with a N. W. wind. At the same " moment, about 7 a. m. of the 17th of October, the sky was extraordinarily clouded over Grenoble. We had at " the same time the suffocating blast of a S. E. sirocco. Simultaneously with the bloody kind of rain, fell the " enclosed very rich red dust by which the post-carriage was covered to the depth of one or two lines. " [16] The hurricane was remarked at Lyons, only at evening from six o'clock till midnight, and the fall of dust " was noted from 6½ to 11½ o'clock, (as in the districts of Isère, Drôme and Ardèche). The rain was not ex" cessive, but the sky was terrible. There were two divisions of the storm, one in the South, the other in the " Northwest. The wind changed from minute to minute. Flashes of wonderful size streaked through the sky, " not vertical but horizontal, and passed over more than one-third of the circumference. At every flash the " birds of passage on their flight redoubled their despairing cries. In the streets, in the open chambers, on " the pavements were caught ducks, quails, juniper-birds, black-birds, nightingales, fly-catchers, &c., &c."

All the materials for a communication respecting the details of the hurricane were collected in Lyons. A chemical analysis made there of the dust had shown as chemical constituents, flint-earth, carbonic acid, chalk, and oxide of iron. The specimen of the fallen dust enclosed in the letter, was very carefully and closely folded in fine letter paper, packed very judiciously, and in volume about equal to three peas.

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* See concluding remarks by M.

This dust collected near La Verpillière, not far from Lyons, has exhibited the following characteristics:

1. In color the very fine dry dust was ochre-yellow, on moistening with water it was rust-red, clearly rruginous.

2. By the smallest motion it was immediately scattered, and its particles were more mobile than those of meal.

3. The mechanical collection appeared under the microscope as composed of very different substances, ıt with no decided volcanic particles. Very fine sand-like fragments of quartz and irregular reddish particles ith a still finer yellowish mould composed the principal mass, in which so many definite fragments of small ganic bodies lay strewn, that every most minute grain of dust contained some of them.

The following 73 species are determined and clearly fixed.

Polygastrica 39, &c., &c., [pp. 16, 17.]

8] This mixture of known and fixed corpuscules amounts to about $\frac{1}{8}$ ($12\frac{1}{2}$ per cent.) of the whole volume. hether the remaining part of the principal mass is of organic origin or is yet to a great extent composed of ganic flint and chalk animalcules changed past recognition, cannot be determined. But in particular, the spicion arises that a part of the yellow corn-like very fine solid mould perhaps belongs to the *Gallionella rruginea*, but it cannot be clearly enough recognized.

Whoever adopts the first unscientific impressions may say it is self-evident that in the dust of the surface, heeled up and carried about by a hurricane, there must be all kinds of microscopic organisms, and in the cessary limitless variations of these, it were not worth the trouble to point out each distinctly.

By deliberate scientific investigation, however, the following circumstances have been here noticed as markable:

a. The meteor dust fallen near Lyons, (La Verpillière,) like those previously investigated from Genoa d Malta, does not at all resemble our ordinary atmospheric and storm-dust, which in Europe, by reason of e seldom failing moisture and the predominant character of soil, has, when dry, a more or less gray color, d only in limited localities, where the surface is without moisture, it appears so seldom reddened by clay or n oxide, that it has not yet attracted the attention of meteorologists, much as they have occupied themselves out sulphur rains, and such things.

b. The meteor-dust of Lyons has, by its rust-yellow, and when moist, rust red color, by its great fineness well as by its chemical and mechanical composition, precisely the same character as that which falls in the lantic Ocean regularly, and without any hurricane, as in the trade winds; and in this character the dust ıich clouded the whole atmosphere, and fell at Malta in 1834, and at Genoa on May 16th of this year, 846,) agree, as already stated.

c. This agreement in character not only obtains in general, but in particulars, in a very striking manner follow:

1. The sirocco dust of the 17th of October shows firstly, in its composition, the more seldom marine anilcules [19] mingled with prevailing microscopic fresh water organisms. There are as yet five decided ırine forms discovered therein.

Flint-shelled polygastrica, &c., &c.

Moreover, there are six bodies possibly belonging also to the sea water, of which the genera, however, live also in fresh water, all *Polygastrica*, &c., &c.

There are then, perhaps, 11 among the 73, and certainly 5 to 8 marine forms, the remaining $\frac{3}{4}-\frac{6}{7}$ are decided fresh water forms of terra firma.

2. As in the Atlantic meteor-dust, so also in that of Lyons, the Phytolitharia are very numerous, which points to important conditions in the relations of the terrestrial surface, and the residue of vegetation, and *contradicts the formation of the substance in the atmosphere itself.*

3. The forms more frequently predominating in the number of individuals in the Lyons dust are—

Polygastrica, &c., &c.

These very forms are not merely present, but always, or mostly, predominant in the eight previously noted kinds of Atlantic dust.

4. Of the 73 forms of the Lyons dust, 51 have been already noted in the previously analysed kinds. In all the nine kinds, four forms are similarly present. Polygastrica 3, &c., &c.

[20] The Lyons dust has 24 forms, agreeing with the six kinds of Atlantic dust, and differing from those of Malta and Genoa. In at least two-thirds of all the nine kinds of dust, there are 15 forms in addition to the four common to all.

Polygastrica 5, &c., &c.

d. There are 21 peculiar forms only observed in the Lyons dust, and not in the other collections, as follow:

Polygastrica, 14, &c., &c. (pp. 20, 21.)

[21] Among these 21 forms, there are only two wholly new ones, so well fixed that they are determinable, *cocconeis atmospherica* and *eunotia? lævis;* and perhaps, also, the three fragments which all belong to unknown forms. Moreover, the neatly-lobed vegetable scales seem, on account of their peculiarities, to require to be placed among the non-European forms. The remaining fifteen forms are entirely similar to others previously known.

e. The principal mass of all these 73 forms is European; many are also recognised as from other parts of the world. No form is characteristically African; but again, there are two which seem to be characteristic for South America.

Eunotia Pileus. Hymantidium Zygodon.

Since the forms observed only in the Lyons dust, and occurring generally only in dust of this kind, denote no terrestrial father-land, there should be, perhaps, among them a further classification. There are seven of these:

Cocconeis atmosphærica,
Coscinodiscus, &c. (p. 21.)

The *Eunotia Pileus* is less accurately determined as an American form, according to the investigations hitherto made, since it has now recently been observed once in Spain; but this latter is only a specimen of one dead shell, and in Guiana it has been observed in numberless collected living specimens, consequently much more probably from here than from the former place.

f. That the red dust in its mingling with the rain on the 17th of October formed a blood-like water, as the journals repeatedly informed us, is only worthy of notice as being the first time that this blood-colored kind of meteor has been directly observed.

g. The fact is very especially remarkable in this fall of dust, that, notwithstanding its agreement with the [22] Atlantic dust, which always showed dead and empty shells of organisms, the *eunotia amphyoxis has often been found with its green ovaries, and therefore capable of life.*

The following are the general results and characteristics of the new sirocco dust:

1. The dust of the sirocco hurricane of the 17th of October, 1846, at Lyons, differs from the ordinary European and North African dust, but agrees entirely with the meteoric dust which, since 1830, have been observed in the Atlantic Ocean, near the Cape Verd Islands, and in the sirocco at Malta and Genoa. The specimens of all these kinds are as though taken from one and the same well-mixed package of dust, although their highly various origin, and their innumerable multitude, are perfectly demonstrated.

2. Besides the direction of the wind, (which, according to the most recent and fortunate collections and conclusions of meteorologists (Dove) gives no indication of the source of the storm,) no internal nor external evidence of the dust pronounces for its origin in Africa, but there are many forms there chiefly or wholly native to South America.

3. Moreover, the Lyons dust cannot have arisen from the far interior of a continent, but only from a coast region, if it have generally a single origin, since it contains marine forms now living.

4. The contents of this last sirocco dust are again not only like those of the very distant Cape Verd Islands, but even so very like what has fallen there for sixteen years, that the difference is far exceeded by the agreement, and seems only to lie in the defect of our knowledge.

5. A so uniform mixture, in such great numbers and so great intervals of time and space, can arise, even though the investigations include so few occasions, neither from one limited place, where, indeed, varying moist seasons produce varying organisms, nor generally can it be an unimportant instantaneous upraising of a local dust by whirlwind. It appears to belong necessarily to a more constant series of relations, a constant [23] cloud-dust swimming in the atmosphere, and always receiving new contents, which a hurricane accidentally meeting may scatter in any direction.

6. In how far certain historical kinds of thick fog, (of course excepting that arising from peat fires,) coincide with the phenomenon, we cannot now decide; but it may be useful to point out the possibility of such a coincidence.

7. The whole number of organic corpuscules detected in the nine kinds of dust yet known, and so strikingly similar, amounts now to 19 species, namely:

Polygastrica,	57
Phytolitharia,	46
Polythalamia,	8
Particulæ plantarum molles,	7
Insectorum fragmenta,	1
	119

Of these, seventeen kinds, - - - - - - - 8 Polythalamia,
" " " - - - - - - - 7 Polygastrica,
" " " - - - - - - 2 Phytolitharia, (spongolithides,)

belong to the sea water; the remaining 102, with the exception, perhaps, of the few new kinds, are fresh water forms.

8. *Living forms have been brought in the more recent dust*, which, however, gives no scientific negative to the idea of an extensive sphere of life in the atmosphere. The cotemporaneous phytolitharia are earth-forms—parts of not independent plants.

9. The dust bears no trace of volcanic action.

10. Simultaneously with the falling rain, it produces the appearance of red water (blood-like to excited dispositions.)

11. The sirocco of Southern Europe, often producing disease, and accompanied by a dusty orange-colored atmosphere, seems evidently, as I had previously suspected, to spread the Atlantic organic dust regularly (Malta, Genoa, Lyons,) wide over Europe.

May these facts yet continue to awaken interest in this subject among scientific men, especially those in nautical life. The terrestrial origin of remarkable meteors connected with atmospherical dust-clouds, or great storms, becomes, through microscopic analysis of the dust, so certainly and so immediately determined, that a [24] scientific, and in other respects a highly interesting terrestrial and ultra-marine telegraph may sometimes be made use of, as has recently taken place, and previously, in 1845, in the case of Hecla."

VI.

"*About a New Specimen and Analysis of the Sirocco-Dust of the* 16*th of May*, 1846, *from Genoa.*

[Communicated, 1846.]

"M. L. Von Buch delivered to me a few weeks since, at a session of the Academy, a new specimen of the sirocco dust of May 16 of this year, which the Director of the Navigation School in Genoa, General the Duke of Marmora, Corresponding Member of the Academy, had perceived to be worthy of a more accurate analysis, and had given over to him. [Among the characteristics] of this dust were noted the following: 4. *Synedra entomon*, as a South American form, *Discoplea atmosphærica*, are characteristic in the Lyons and Maltese [25] dust. * * * These seven forms (new in the Genoese dust) are not peculiar, but have been before pointed out in the Atlantic and South American dust of the atmosphere.

VII.

"*About the Red Snow with the Fohn Wind in Pusterthale, in Tyrol, on the 31st of March,* 1847*; its peculiarities, and very remarkable relationship to the Atlantic Meteor Dust.*

[Communicated in 1847.]

"On the 31st of March, 1847, there fell at St. Jacobs, in Deffereggen, (Tefferecken,) with a south wind, [26] between ten and eleven at mid-day, a colored snow, which gave the whole wintry region a peculiar tint. An attempt was made to collect this strange substance, and a large amount of an uncommonly fine earth was obtained, which when dry was tasteless, and was intermingled with an extremely fine glittering sand-dust, and appeared of a brick color."

[27] Mr. Jos. Oellacher made a chemical analysis of the dust and "on account of the intermingled vegetable-wool and organic matter filled with nitrogen, believed the dust to be of terrestrial and not of cosmical origin.

Mr. Oellacher obtained, moreover, the result that the red Sahara-dust (brought from Africa) contains almost precisely the same elements as the above snow-dust. Thus he believed that he had, for the first time, directly proved the true African nature of the sirocco-dust.

[28] Since microscopic investigation has for a long time given a result entirely different from this chemical one, it appeared to me to be of very great scientific interest to endeavor to ascertain whether the difference was in the substance itself or in the mode of investigation, since (if the latter) very similar phenomena might be produced by wholly different causal conditions and elements, the deciding of which would here be of peculiar scientific interest."

Ehrenberg finds that the identity of the two kinds of dust is not established by the above-mentioned chemical investigation, and indeed that such investigations may not be expected necessarily to decide such a question. He then proceeds (pp. 28 – 36) to give the details of his own microscopic examinations, and finds among other things the following:

[36] 8. "All the forms have certainly the character of European genera, and the most are European species; yet most of them also are found in American localities, and less frequently in African. Comparing now the dust of this year (1847) from Tyrol, with the sirocco-dust of Malta, Genoa, and Lyons, previously described, and with the previously analysed meteor-dust of the Cape Verd Islands and the Atlantic, we obtain the following highly remarkable relations.

1. The color and the whole exterior in all characters, fineness, adhesiveness of parts, weight, are not in the dry Tyrol snow-dust as in the ordinary atmospheric dust of storms, but entirely and wholly similar to the sirocco and Atlantic dust. 2. The organic contents which so highly characterize the Atlantic meteor-dust, and are similarly found in the sirocco-dust, are also found to agree in a very remarkable manner in the snow-dust.

[38] 5. That the Fohn wind and sirocco always appear as the continuation of the West India whirlwinds is, by the new rotatory theory of storms, and in contradiction of the old opinion that they came from Africa, now become highly probable, and the fact can be proved, and made scientifically certain, by this specially moved dust. That however the explanation is not yet fully conclusive, will appear from the following remarks:

The already published analysis of the meteor-dust, fallen from 1830 to 1847, in the Harmattan or Trades, [39] Sirocco and Fohn, show a great similarity in the intermingling of organic particles. Such an intermingling might be expected, *a priori*, from every storm. But that in all, *similar* particles, and *great numbers of different particles, should similarly occur*, is very striking, and becomes yet more so when we consider *that for* 17 *years, and in different times of the year, they remain so similar that even the predominating forms, numerically, of one kind of dust, are also the predominating forms in all the rest.* That materials existing on the surface of the earth are so similarly carried about by storms is not supposable, if we give up the highly improbable notion that all the hitherto investigated meteors and storms had their origin at precisely the same limited locality of one and the same country. Wherever life is found, the seasons of the year or of rains alternate, and with them alternate, not only in theory but according to my own frequent and direct experience, either the mode or the number of individual living forms. Considering the intermixture of marine animals, their constant similarity in number, and the always recurring predominance of the same forms, we see that no possibility remains of supposing that the meteor-dust, which the European sirocco and the German Fohn wind bring, and which covers the Atlantic Ocean *only in the region of the trades*, even in the European winter (January and February), should *always originate directly from the West Indies.* Impossible as it is to conceive of all the storms now compared from 1830 to 1847, as having a continuous genetic connection, it is equally impossible also to imagine the masses of dust transported by them, with such a degree of similarity, *not to have a genetic connection.*

It appears, therefore, as had been directly pointed out previously in November, 1846, now to become even the more necessary to suppose *a dust-cloud to be held constantly swimming in the atmosphere by continuous currents of air, and lying in the region of the trade winds, but suffering partial and periodical deviations.* This will remove every difficulty, from the fact that all the accurately-observed siroccos and Fohn winds, notwithstanding the different years and seasons of year, always show the same intermingling of meteor-dust. [40] On the other hand, notwithstanding the commingling of South American forms, we cannot necessarily suppose that all the siroccos and Fohn-winds must take their origin from a single locality in the West Indies, entirely different from their direction, which is from the South, nor that they must always partake of the nature of whirlwinds. It necessarily remains only on account of the dust they bring to assume that they commence in the region of the trade winds, and it is uncertain whether in the neighborhood of Africa or America. Since the true trade wind scarcely touches the continent of Africa, they could not have come immediately from its surface, but might well come from America, whence originally the mass of the transported dust brings the characteristics with it. In such relations, it will no longer appear strange that the yellow meteor-dust of a storm in Beloochistan, observed by Mr. Pottinger, should possess the same contents, and belong to the same class of substances without necessarily supposing that Asiatic storm to have commenced in Cayenne or the Antilles.

[41] 9. The opinion presented to the Academy in November, 1846, respecting the meteor-dust that fell with the sirocco storm at Lyons, on the 17th of October, its intermixture of 73 described organic parts, and their

probable connection not with Africa, but with Guiana in South America, has found a further decided support in the recently published and thorough investigation of the course of the hurricane, by Mr. Fournet of Lyons. Immediately under date of the 3d of January, after sending my results enclosed in a letter, Dr. Lortet informed me that according to the investigation of Mr. Fournet, the hurricane of the 11 (9 Oct.) in the Havanna, Grenada, St. Vincent, Martinique, and probably also at Oyapack in Cayenne, appeared to have formed the beginning of this storm. So, therefore, *microscopic analysis had previously determined the point of origin of the substance with unexpected accuracy.*

[43] 10. Very probably the meteor-dust which fell with rain on the 31st of March, 1847, at Chamberes, in Savoy, the account of which appears in the Appendix to Mr. Fournet's excellent Treatise on the Lyons Dust (pp. 97, 98), is the same phenomenon with the Tyrolese snow-dust, whereby the extent and direction of the storm becomes more unlimited, and it receives also the peculiarity that *they were only connected by clouds*, since no dust-fall was observed in the intervening countries. (And if the observation of General Scott, also quoted, p. 100, according to which, from the 23d to the 28th of March, 1847, at the siege of Vera Cruz, a dust-bringing* hurricane raged from the N., be supposed to refer to the same storm, we shall then have the same event directly observed in America.)"

VIII.

" *About the cinnamon, and brick-colored Meteor-dust, sometimes accompanied by fire balls; new Examinations, and proof of similar organic composition in this dust for 44 years; and some inferences respecting it.*

[Communicated in 1847.]

" Within a few weeks, new materials have accumulated for the investigation of the reddish and brown-yellow atmospheric dust, of which the Academy has been informed for three years, and which last appeared as the red snow-dust in Tyrol. As the examination appeared to possess general scientific interest, I now bring forward the results."

Ehrenberg then gives the microscopic analysis of two specimens of dust, one of which fell in 1813, in Calabria, and the other in 1803, in Italy and Sicily. He finds the same general results as quoted above for the other specimens, viz. several species peculiar to South America, and none peculiar to Africa.

Review of results and Suggestions.

[163] " The more I have busied myself with these examinations of atmospheric dust, the more confident have I become that the subject is of great, manifold and rapidly-increasing import; that it conflicts with not a few important and weighty ideas, and draws out and establishes other new and important scientific notions. This is but the beginning of a future great department of knowledge. I hope that the following attempt to deduce results from the observations which I have collected with some trouble and very great care and circumspection, may not lead to giving too great prominence to what is unimportant, nor fail to place what is important in a light that may suggest farther and correct investigations.

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* Was not the dust of this Norther, from the sandy beaches of the Mexican coast?—M. F. M.

1. The phenomena here collected, under the name of trade-wind dust, have been hitherto known as dust-hurricanes, red dust-rain, red volcanic-ashes-rain, &c. &c.

[164] 2. The name trade-wind dust was here first applied to the Atlantic meteor-dust. The connection of this with the trade wind, and not with the harmattan, was definitely pronounced in 1816 by Captain Tuckey; it was made known and published from the Prussian merchant-ship, Captain Wendt, in 1830; in 1837, by Bennett; and in 1839, by Captain Hayward. And Admiral Roussin separated the constant coast-cloud from the periodic harmattan, in 1817.

[166] 5. In the microscopic analysis of this dust, fresh water and land forms are by far the most predominant. Only the following genera belong alone to the sea-water:

Coscinodiscus,
Diploneis,
Goniothecium,
Grammatophora,
Biddulphia.

And beside these, all the Polythalamia and some spongoliths are sea formations. Sp. Clavus, censcephala Caput serpentis, obtusa, robusta.

Known African characteristic forms are not to be found. The great number of forms are found in various parts of the world, even in Europe and Africa. The following are American:

Arcella constricta,
Desmogonium guyanense,
Eunotia Camelus,
  depressa,
  Pileus,
Eunotia quaternaria,
  quinaria,
Gomphonema Vibrio,
Himantidium Papilio,
  Zygodon,
Navicula undosa,
Stauroneis dilatata,
Surirella peruana,
Synedra Entomon,
Fragmenta incerta,

6. There is in Africa no trade wind and no surface of red dust which can supply the trade wind. The sand of the Sahara is white and gray; the cloud-dust of the trades is cinnamon-colored. Since, according to experience, an upper trade wind corresponds with the lower at the Peak of Teneriffe, and since the lower is not an African wind, but different from the harmattan, it follows that only the upper wind can carry the dust to Africa; and since probably it does not continue beyond, falling there, and becoming the lower trade wind, it precipitates the dust in that region. The fact that South American forms have been observed in the dust of the trade winds gave rise originally to this theory, and is still favorable to it, and moreover the number of these forms continually increases. The American dust, therefore, raised up in the region of equatorial calms and ascending (South American) currents of air, and carried by the upper eastward trade winds to Africa, by this vertical downward current, is returned to America through the lower western trades, unless it have been previously deposited in space.

[167] 8. That this dust is coarsest near Africa may be explained by this direct sinking down in that region, while lower in the ocean it is more sifted out; but the dust of March 9, 1838, is not coarser than that from San Jago in the Cape Verd Islands, in 1833. Thus, the place of falling down may always show the coarsest parts.

[168] 10. It is worthy of remark, that North America is seldom reached by the dust, and no ship in the Pacific Ocean, whence we may conclude that the constant dust-cloud zone of the upper atmosphere truly belongs only to the Atlantic Northern trades; and over America, when it begins to appear in the South, wholly fails in the North, as over the Sandwich Islands, and consequently cannot be brought down by fire-meteors and meteoric stones."—*Vide "Passat-Staub und Blut-Regen, ein grosses organisches unsichtbares Wirken und Leben in der Atmosphäre.—Mehrere Vortrage von Dr. Christian Gottfried Ehrenberg: Berlin*, 1849."

It is now proved that there is a perpetual upper current of air from South America to Northern Africa; and that the volume of air in these upper currents which flows to the Northward is equal to the volume which flows to the Southward with the N. E. trade winds, there can be no doubt.

The "rain-dust" has been observed most frequently to fall in spring and autumn; that is, the fall has occurred after the equinoxes, but at intervals from them varying from 30 to 50 days.

Now, any one who will take the trouble to consult my "trade wind charts" of the Atlantic Ocean will see that at the time of the vernal equinox the equatorial calms are "raging" between the parallels of 4° N. and 4° S., and that consequently the places between these parallels are then in their rainy season.

The "rain-dust," therefore, it may be inferred, could not well be taken up between these two parallels at such a season. The earth is then flooded with rain, and there prevails a great calm; and as the air is saturated with moisture, and consequently as there is no—little or no—evaporation going on at such a time and place, it is difficult to imagine how any of the microscopic organisms of a locality so situated should be taken up in the atmosphere.

But if the examination of these charts be carried a little farther, it will be perceived that at the time of the vernal equinox, the valley of the lower Oronoco is then in its dry season,—every thing is parched up with the drought, the pools are dry, and the marshes and plains arid wastes. All vegetation has ceased, the great serpents and reptiles have buried themselves for hibernation;* the hum of insect life is hushed; and the stillness of death reigns through the valley.

Under these circumstances, the lightest breeze raising dust from lakes that are dried up, and lifting motes from savannahs that are parched up, will bear them away like clouds in the air.

This is the period of the year when the surface of the earth in this region, strewed with impalpable and feather-light remains of animal and vegetable organisms, is swept over by whirlwinds, gales, and tornadoes of terrific force; this is the period for the general atmospheric disturbances which have made characteristic the equinoxes. These conditions appear sufficient to afford the "rain-dust" for the spring showers.

At the period of the autumnal equinox, another portion of the Amazonian basin is parched with drought, and liable to winds that fill the air with dust, and with the remains of dead animal and vegetable matter; these impalpable organisms which each rainy season calls into being, to perish the succeeding season of drought, are perhaps distended and made even lighter by the gases of decomposition which has been going on in the period of drought.

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* Humboldt.

May not, therefore, the whirlwinds which accompany the vernal equinox sweep over the lifeless plains of the lower Oronoco, take up the "rain-dust" which descends in the Northern hemisphere in April and May; and may it not be the atmospherical disturbances which accompany the autumnal equinox that take up the microscopic organisms from the upper Oronoco and the great Amazonian basin for the showers of October?

If there be reason in this question, and plausibility in the answer it suggests, an affirmative reply would authorize us to infer that the "father-land" of the "rain-dust" is one place for the spring and another for the autumn, and therefore it might be expected that the microscope would detect certain infusoria that are peculiar each to its own dust and locality.

These are the periods and these the conditions most favorable for raising the "sea-dust," and may we not therefore refer to these conditions, and suggest that in them is to be found reason for the greater liability of the "rain-dust" to fall in April and May, October and November, than at other times.

If one season of the year be most favorable to the taking up of the infusoria, another season may be most favorable for letting them down again. The charts indicate the former, the microscope shows the latter to be the case.

And may we not therefore regard the interval between the time most favorable for the ascent, and the time in which the descent is most liable to occur, as a sort of general indication as to the length of the time required for the transportation? and therefore as to the rate of motion of the atmosphere in its general channels of circulation?

These suggestions as to the taking up the dust in the valley of the Oronoco derive weight from the observations of the closest of observers:

The Baron von Humboldt, in his "Aspects of Nature," thus contrasts the wet and the dry seasons there:

"When under the vertical rays of the never-clouded sun, the carbonized turfy covering falls into dust, the "indurated soil cracks asunder as if from the shock of an earthquake. If at such times two opposing currents "of air, whose conflict produces a rotary motion, comes in contact with the soil, the plain assumes a strange "and singular aspect. Like conical-shaped clouds, the points of which descend to the earth, the sand rises "through the rarified air on the electrically-charged centre of the whirling current, resembling the loud water-"spout, dreaded by the experienced mariner. The lowering sky sheds a dim, almost straw-colored, light on "the desolate plain. The horizon draws suddenly nearer, the steppe seems to contract, and with it the heart "of the wanderer. The hot, dusty particles which fill the air increase its suffocating heat, and the east wind "blowing over the long-heated soil brings with it no refreshment, but rather a still more burning glow. The "pools which the yellow, fading branches of the fan-palm had protected from evaporation, now gradually disap-"pear. As in the icy north the animals become torpid with cold, so here, under the influence of the parching "drought, the crocodile and the boa become motionless and fall asleep, deeply buried in the dry mud *

* * * * * * * * * *

" * * * The distant palm bush, apparently raised by the influence of the contact of unequally heated and therefore unequally dense strata of air, hovers above the ground, from which it is separated by a narrow intervening margin. Half concealed by the dense clouds of dust, restless with the pain of thirst and hunger, the horses and cattle roam around, the cattle lowing dismally, and the horses stretching out their long necks and snuffing the wind, if haply a moister current may betray the neighborhood of a not wholly dried-up pool. * * * * * * *

" * * * At length, after the long drought, the welcome season of the rain arrives; and then how suddenly is the scene changed! * * * * * *

" * * * Hardly has the surface of the earth received the refreshing moisture, when the previously barren steppe begins to exhale sweet odors, and to clothe itself with kyllingias, the many panicules of the paspulum, and a variety of grasses. The herbaceous mimosas, with renewed sensibility to the influence of light, unfold their drooping, slumbering leaves, to greet the rising sun; and the early song of birds, and the opening blossoms of the water-plants, join to salute the morning." * *

The color of the "rain dust," when collected in parcels, and sent to Ehrenberg, is "brick-red;" or "yellow ochre," when seen by Humboldt in the air, it was less deeply shaded, and is described *by him* as imparting a "straw-color" to the atmosphere. In the search of spider lines for the diaphragm of my telescopes, I procured the finest and best threads from a cocoon of a mud-red color; but the threads of this cocoon, as seen singly in the diaphragm, was of a golden color; there would seem, therefore, no difficulty in reconciling the difference between the colors of the rain dust, when viewed in little piles by the microscopist, and when seen attenuated and floating in the wind by the great traveller.

It appears, therefore, that we here have placed in our hands a clue, which, attenuated and gossamer-like though it at first appears, is nevertheless palpable and strong enough to guide us along the "circuits of the wind" into "the chambers of the South."

The frequency of the fall of "rain dust" between the parallels of 17° and 25° N., and in the vicinity of the Cape Verd Islands, is remarked upon with emphasis by the author. It is worthy of remark; because in connection with the investigations at the Observatory, it is significant.

The latitudinal limits of the northern edge of the N. E. trade winds are variable. In the spring they are nearest to the equator, extending sometimes at this season not further from the equator than the parallel of 15° N.

The breadth of the calms of Cancer is also variable; so also are their limits. The extreme vibration of this zone is between the parallels of 17° and 38° North, according to the season of the year.

According to the Charts, this is the zone in which the upper currents of atmosphere that ascended in the equatorial calms, and flowed off to the northward and eastward, descend. This, therefore, is the zone in which the atmosphere that bears the "rain dust" descends to the surface; and this, therefore, is the zone, it might be supposed, which would be the most liable to showers of this "dust." This is the zone in which the Cape Verd Islands are situated; they are in the direction which theory gives to the upper current of air from the

Oronoco and Amazon with its "rain dust," and they are in the region [illegible] all of which are in striking conformity with the theory of circulation.

It is true that in the present state of our information, we cannot tell why this rain dust should not [illegible] gradually precipitated from this upper current, and descend into the stratum of trade winds, as it passes from the equator to higher northern latitudes. Neither can we tell why the vapor which the same winds carry along, should not, in like manner, be precipitated on the way; nor why we should have a thunder storm, a gale of wind, or the display of any other atmospherical phenomenon to-morrow, and not to-day—all that we can say is, that the conditions of to-day are not such as the phenomenon requires for development.

Therefore, though we cannot tell why the rain dust should fall not always in the same place, we may nevertheless suppose that it does not, in passing the same parallels, always meet with the conditions—electrical and others—favorable to the descent—and that these conditions might occur now in this place, now in that. But that the fall does occur always in the same atmospherical vein or general direction, my investigations would suggest, and Ehrenberg's researches prove.

Judging by the fall of rain dust, we may suppose that the currents in the upper regions of the atmosphere are remarkable for their general regularity, for their general direction and sharpness of limits, so to speak.

We may imagine that certain electrical conditions are necessary to a shower of "rain dust," as well as to a thunder storm, and that the interval between the time of the equinoctial disturbances in the atmosphere to the fall of these showers, though it does not enable us to determine the true rate of motion in the general system of atmospherical circulation, yet it assures us that it is not less on the average than a certain rate.

I do not offer these remarks as an explanation with which we ought to rest satisfied; I rather offer them in the true philosophical spirit of the distinguished microscopist himself:—simply as affording, as far as they are entitled to be called explanation, that explanation which is most in conformity with the facts before us, and which is suggested by the results of a novel and beautiful system of philosophical research.

M. F. M.

MERIDIAN CIRCLE—Continued.

PAGE.
209—No. 11, (Margin,) for — 1 1.95, read — 1 11.18.
" " 34, " for — 1 9.22, read — 1 11.33.
213— " 5, Column 8, for 1 50 35.73, read 1 51 35.34.
217— " 44, (Margin,) for + 0 0.25, read + 0 0.19.
220— " 18, Column 3, dele 2d &.
222— " 29, " 3, for 2d and N. L., read 1st and N. L.
225— " 45, " 3, for — 0′ 14″.27, read — 0′ 20″.66.
" " 4, " 3, for 343 28 13.71, read 343 28 7.09.
" " 9, " 3, for 22 21 52.92 read 22 21 46.30.
" In the marginal columns 1, 2, 4, insert respectively 37, Saturn, 0′ 9″.81.
227—In the marginal columns 1, 2, 4, insert respectively 40, Sun, 15 46.33.
229—No. 8 and 9, Column 3, for — 1 21.41, read — 1 20.71.
" " " " 4, for 307 39 55.51 read 307 39 59.91.
" " " " 9, for —13 26 25.15, read —13 26 20.73.
231— " 14, (Margin,) for — 1 10.91, read — 1 10.21.
232— " 35, Column 12, for 207 18 35.5, read 302 18 35.5.
233— " 35, " 3, for — 1′ 22″.70, read — 1′ 21″.98.
" " 35, " 4, for 307 17 16.49 read 307 17 17.21.
" " 35, " 9, for — 13 49 6.01, read —13 49 5.29.
" In the marginal columns 1, 2, 4, insert respectively 50, Saturn, 0′ 10″.82.
237—No. 2, Column 8, for $\overset{h.}{20}\ \overset{m.}{26}\ \overset{s.}{24}.51$, read $\overset{h.}{20}\ \overset{m.}{26}\ \overset{s.}{24}.47$.
" " 49, " 3, for — 1′ 22″.25, read — 1′ 21″.54.
" " 49, " 4, for 306 49 3.48, read 306 49 4.17.
" " 49, " 9, for — 14 17 21.01, read — 14 17 20.27.
" " 52, " 3, for + 21′ 19″.53, read + 21′ 2″.83.
" " 52, " 4, for 321 3 48.73, read 321 3 32.03.
" " 52, " 9, for — 0 2 35.71, read — 0 2 52.41.
" " 1, (Margin,) for + 1 11.17, read + 1 11.13.
239— " 28, Column 3, for — 1 22.03, read — 1 21.32.
" " 28, " 4, for 306 44 44.15, read 306 44 44.86.
" " 28, " 9, for —14 21 39.84, read —14 21 39.13.
248— " 36, " 1, insert Oct. 5.
249— " 31, " 3, for — 1 26.38, read — 1 25.74.
" " 31, " 4, for 306 17 6.14, read 306 17 6.87.
" " 31, " 9, for —14 49 19.62, read —14 49 18.89.
" " 44, " 3, for — 1 26.92, read — 1 26.29.
" " 44, " 4, for 306 15 36.97, read 306 15 37.60.

MERIDIAN CIRCLE—Continued.

PAGE.
249—No. 44, Column 8, —14 50 48.79, read —14 50 48.16.
251— " 35, " 3, for — 1 25.61, read — 1 25.00.
" " 35, " 4, for 306 13 4.07, read 306 13 5.31.
" " 35, " 9, for —14 53 20.50, read —14 53 19.97.
" " 48, " 3, for — 1 28.50, read — 1 27.89.
" " 48, " 4, for 306 12 2.05, read 306 12 2.66.
" " 48, " 9, for —14 54 24.51, read —14 54 23.90.
255— " 32, " 5, for 22 33 57.56, read 22 33 57.60.
" " 32, (Margin,) for + 1 7.87, read + 1 7.81.
259— " 40 & 41. Col. 9, for +23 22 34.03 read —23 22 34.03.
" In the marginal Columns 1, 2, 3, insert respectively 51, Moon, + 1 6.99.

EQUATORIAL.

In the collected means.

PAGE.
314—June 13, 1845. Change the sign of $\Delta\delta$ and $\Delta\rho$.
" " 14, " Dele the places of stars *d* and *f*.
" " 15, " Change the sign of $\Delta\delta$ and $\Delta\rho$.
315— " 17, " Dele star *k*, and change sign of $\Delta\rho$ in Æ.
" " 24, " Change the sign of $\Delta\delta$ and $\Delta\rho$.
316— " 25, " " " " "
316—July, 1, 1845. " " " "
319—Jan. 19, 1846. " " " " for B^1 — Star *h* and *i*.
320— " 14, " For $\Delta\alpha = -\overset{m.}{2}\ \overset{s.}{29}.50$, read $+\overset{m.}{2}\ \overset{s.}{29}.50$.
322—Feb. 5, " Insert for $\Delta\rho$ in Dec'l. $+''.16 - ''.04$ and $+ .''13$, respectively.
324— " 12, " For Δ^2 — Star *i*, read B^2 — Star *i*.
328—March 5, " For 9°58′ 51″.68, read — 9°58′ 51″.68.
329— " 10, " For $B^2\ B^1 = +\overset{s.}{27}.30$, read $-\overset{s.}{27}.30$.
" " 14, " Change the sign of $\Delta\delta$ and $\Delta\rho$, for B^2—B^1.
330— " 21, " For B^1 — Star $\xi = +\overset{m.}{3}\ \overset{s.}{0}.32$, read $-\overset{m.}{3}\ \overset{s.}{0}.32$.
331—April 3, " For B^1 — Star $\psi = +$ 4 32.95, read + 4 29.48.
338— " 27, " Dele the record of this date.
" " 27, " For March 14, read April 27.
" The result for Comet — Star *ε* should be

Sid. time. h. m. s.	m. s.	m. s.
14 29 45.5	— 4 17.85	— 11 9.33

All the errors detected on page 2—43, have been corrected in the results given in the following pages.

PAGE.
364—Instead of μ Hydræ, read ω Hydræ.
365—Instead of Serpentis (3295,) read Sextantis (3295.)
" " 11 19 17.76, read 11 19 18.76.
" " 12 48 60.25, " 12 48 59.89.
" " 13 17 17.88, " 13 17 17.52.

All the stars called Comet Stars, on this page, and γ Cephei, should be increased by 12*h*.

365—Instead of 20 15 0.49, read 21 14 59.26.
" " 21 14 59.17, " 21 14 59.27.
369— " 21 58 19.22, " 21 58 19.82.
" For α Piscis Aust., instead of 22.29, read 22.49.
" Instead of 23 9 33.16, read 23 9 23.16.
366—Instead of η Bootis, read γ Bootis.
" " β Scorpii, " β^1 Scorpii.
367— " 19 8 39.84, read 19 8 39.24.
367— " 19 8 37.78, " 19 8 38.78.
" " Aquilæ, " δ Aquilæ.

PAGE.
368—Instead of 20 36 10.05, read 20 36 19.05.

CATALOGUE OF STARS.

428—No. 14, Declinations, for +, read —.
" " 32, No. of Observations, insert 71.
" " 42, Name, for 694, read 594.
429— " 81, Instrument, insert M.
" " 85, Name, (2d line,) insert Ref.
431 " 175, Declination, for +, read —.
432— " 218, Instrument, insert C.
434— " 309, } Name, insert S. P.
" " 313, }
" " 314, }
437 " 429, Declinations, for —, read +.
438— " 455, Instrument, insert C.
440— " 562, Declination, for 52″.20, read 57″.20.

APPENDIX.

46—8th line, For warmer, read lower.
143—18th " For not, read next.